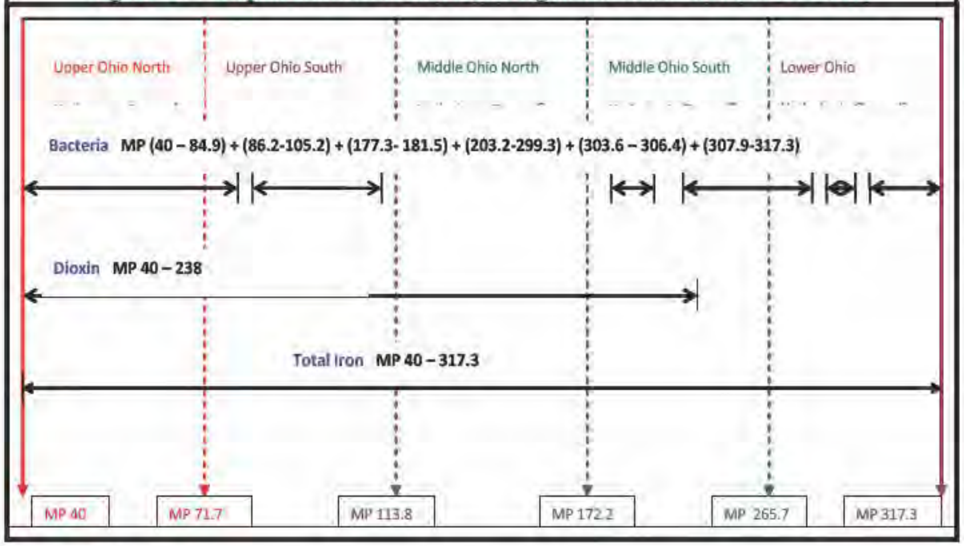
identified as iron-impaired based upon the application of West Virginia's warmwater aquatic life criterion of 1.5 mg/l. The following graphic depicts the currently listed segments of the Ohio River bordering West Virginia.

Figure 10 - Impairments of the West Virginia section of the Ohio River



Tug Fork River

In 2002, EPA developed TMDLs for total iron and total aluminum for the Tug Fork River mainstem. In addition, total iron, total aluminum, total manganese and pH TMDLs were developed for its impaired tributaries. As noted earlier, subsequent revisions to the aluminum and manganese criteria have created uncertainty relative to the impairment status of affected waters and, as such, the validity of many the total aluminum and manganese TMDLs.

Currently, the Tug Fork is identified on the 2008 West Virginia Section 303(d) List for violations of the fecal coliform criteria and biological impairment. The fecal coliform impairment extends from the mouth to river mile 35.7 and the biological impairment reaches from river mile 51.6 to the headwaters.

Interstate Water Coordination

Joint PCB monitoring and TMDL development effort with Virginia

DEP has been working with the Virginia Department of Environmental Quality (Va. DEQ) to assess Polychlorinated Biphenyls (PCBs) impairment along the Virginia section of the Bluestone River. As part of a cooperative project, DEP and Va. DEQ placed a number of semi-permeable membrane devices (SPMD) throughout the Bluestone watershed in Virginia and West Virginia. Several SPMDs were placed in streams that are known or suspected to be historical sources of PCBs. DEP and Va. DEQ are working with both the United States Geological Survey (USGS) and Region III EPA on this project. EPA provided the funding through its RARE grant program while USGS supplied the SPMDs and did the analysis of samples. The product of this cooperative will be a TMDL for the Bluestone River and tributaries with loadings and allocated reductions for sources in both Virginia and West Virginia. The USGS report detailing analytical method and sample results can be found at http://pubs.usgs.gov/of/2007/1272/pdf/OFR2007-1272.pdf

Ohio River Valley Water Sanitation Commission – ORSANCO

As with previous reports, DEP's 2008 Integrated Report includes assessments based on data provided by ORSANCO. Throughout the development of ORSANCO's 2008 Biennial Assessment, DEP has been involved with ORSANCO's efforts to standardize assessments among the "compact" states. DEP personnel continue to participate in several standing committees, along with representatives from other Compact states, charged with helping direct ORSANCO's water quality and biological monitoring efforts.

Chesapeake Bay

The Chesapeake Bay is impaired by nutrients and sediment from multiple sources originating locally and in upstreams states. This large and biologically diverse waterbody is an important economic and recreational resource.

The need to restore this waterbody is a high priority for many agencies, organizations and the public in general. Fourteen percent of the West Virginia's waters drain into the Potomac River and on into the Bay. In addition, portions of the James River Watershed in West Virginia contribute flow to the Bay.

In June 2002, Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding and committed West Virginia to the nutrient and sediment load reductions. The West Virginia Potomac Tributary Strategy, developed in November 2005, includes plans for nutrient and sediment reductions from a variety of West Virginia point and nonpoint sources. All other Bay jurisdictions have developed and are implementing similar plans.

Interstate Commission on Potomac River Basin

The Commission is a non-regulatory agency of basin states (Maryland, Pennsylvania, Virginia and West Virginia), Washington, D.C. and the federal government. The Commission promotes watershed-wide solutions to the pollution and water resources challenges facing the basin and its more than 5.3 million residents. Examples of current commission efforts include Chesapeake Bay Program involvement, stream biological assessments, support of selected stream gages, the Potomac Groundwater Assessment, Potomac Basin Drinking Water Source Protection Partnership coordination and Potomac Watershed Toxic Spill Model support. In addition, the Commission's public outreach program supports and helps coordinate an annual watershed-wide clean up effort and produces and distributes 150,000 copies of the newsletter Potomac Basin Reporter. The commissioners are appointed by their respective jurisdictions and provide policy guidance and oversight for a skilled staff of scientists and educators.

Ohio River Basin Commission

The Commission, in its current form, was founded in 1981. The Commission shall be to: (1) provide a forum for Ohio River Basin states to study, discuss, and develop regional policies and positions on common interstate issues concerning water and related land resources; (2) coordinate to the extent possible water and related land resources planning in the Ohio River Basin; (3) provide representation of regional interest to the federal government; (4) investigate, study and review water related problems of the Basin; (5) assist in water and related land resources training for Basin representatives. The Commission welcomes membership from all states draining to the Ohio river including Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.

Gauley River in Fayette County
Photo by Mike Whitman

Total Maximum Daily Load (TMDL) Development Process

From 1997 until 2003, EPA Region III developed West Virginia TMDLs under the settlement of a 1995 lawsuit, Ohio Valley Environmental Coalition, Inc., West Virginia Highlands Conservancy, et. al. v. Browner, et. al. The lawsuit resulted in a consent decree between the plaintiffs and the EPA that specifies TMDL development requirements and compliance dates. While the EPA was working on developing TMDLs, the DEP concentrated on building its own TMDL program. With the help of the TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL section within the Division of Water and Waste Management.

The TMDL section is committed to implementing a TMDL process that reflects the requirements of TMDL regulations, provides for the achievement of water quality standards, and ensures that ample stakeholder participation is achieved in the development and implementation of TMDLs. The DWWM's approach to TMDL development allows 48 months to develop a TMDL from start to finish. This approach enables the agency to carry out an extensive data generation and gathering effort to produce scientifically defensible TMDLs, and allows ample time for modeling, report drafting and frequent public participation opportunities.

The DEP TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year, five-step process. The watersheds are divided into five hydrologic groups (A - E). Each group of watersheds is assessed once every five years. A map depicting the 32 watersheds and hydrologic groupings is provided as an attachment to this document before the List Key. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the NPDES permitting process and efforts toward limiting nonpoint source loading. Throughout the TMDL development process, there are numerous opportunities for public participation and input.

The West Virginia TMDL program must also accomplish TMDL development in accordance with the consent decree between EPA and the Ohio Valley Environmental Coalition, et. al., which requires all streams impaired by mine drainage to have TMDLs developed by September 30, 2009. Each year, the agency selects waters within the targeted hydrologic group where mine drainage TMDL development is mandated by the consent decree. Other geographically proximate impairments are added to those selections until the agency's annual resources for TMDL development are consumed. In this way, statewide TMDL development by regulatory deadlines is efficiently and systematically accomplished. Barring unforeseen circumstances, all consent decree impairments will have TMDLs developed and approved by September 30, 2009.

The 303(d) list identifies and prioritizes the waters and impairments for which TMDLs will be developed over the next four years by specifying the year in the "Projected TMDL Year" column. The impaired waters intended for TMDL development in 2009, 2010, 2011 and 2012 are known and identified on the list. The remaining legacy mine drainage impairments that, per the consent decree, must have TMDLs developed by 2009 are also specified. For other waters and impairments, where the timing of TMDL development is less certain, the "Projected TMDL Year" is identified as the most future year when opportunity exists per the DEP's plans to develop TMDLs in concert with the Watershed Management Framework.

At any point in time, DEP is working on TMDLs in each of the five hydrologic groups (A-E). Each set of TMDLs moves through several stages of development prior to finalization and the EPA's approval. Table 3 shows the state's TMDL development progress.

The DEP's webpage contains all approved TMDL documents and the draft TMDL documents currently out for public comment. These documents can be found at http://www.wvdep.org/wvtmdl.

Water Pollution Control Programs

Division of Mining and Reclamation

The mission of the Division of Mining and Reclamation (DMR) is to regulate the mining industry in accordance with federal and state law. Activities include issuing both National Pollutant Discharge Elimination System and Surface Mining Control and Reclamation Act permits for mineral extraction sites and related facilities, inspecting facilities for compliance, monitoring water quality, tracking ownership and control, and issuing and assessing violations. DMR is responsible for the computer databases that tracks DMR's activities - Environmental Resources Information System and Applicant Violator System the federal database. The Permitting Unit is responsible for reviewing permit applications for surface and underground coal mines, preparation plants, coal loading facilities, haulage ways, and coal-related dams. This unit also reviews permit applications for non-coal quarry operations (sand, gravel, limestone, etc). Permit review teams staffed with geologists, hydrologists, engineers and others are located in each regional office throughout the state and in the headquarters office.

DMR's Inspection and Enforcement unit is responsible for inspecting all coal mining and quarry operations in the state. It enforces compliance through regular inspections and Notices of Violation, and ensures site reclamation through final release of the operation. This unit is also responsible for civil penalty assessments, show cause proceedings, bond forfeiture and collection.

DMR's Program Development unit is responsible for implementing a proactive approach to policy issues, legislation and training. This unit is designed to keep the Division staff current with technological advances and to provide clear direction through development of cogent policy and guidance to meet legal and regulatory requirements. This unit provides regulatory interpretation and support to field offices, develops and updates handbooks and forms, drafts legislation and initiates regulation changes. Other responsibilities of this unit include Small Operators Assistance Program, public relations, including responses to Freedom of Information Act requests, special projects, employee training and research of laws regulations and policy.

Division of Water and Waste Management

The Division of Water and Waste Management's mission is to preserve and enhance West Virginia's watersheds for the benefit and safety of all. DWWM strives to meet its mission through implementation of programs controlling surface and groundwater pollution caused by industrial and municipal discharges as well as oversight of construction, operation and closure of hazardous and solid waste and underground storage tank sites. In addition, the division works to protect, restore and enhance the state's watersheds through comprehensive watershed assessments, groundwater monitoring, wetlands preservation, inspection and enforcement of hazardous and solid waste disposal and proper operation of underground storage tanks.

In January 2006, Environmental Enforcement became a branch of the Division of Water and Waste Management. Environmental Enforcement promotes compliance with the Solid Waste Management Act, Water Pollution Control Act, Groundwater Protection Act, Hazardous Waste Management Act, Underground Storage Tank Act, and Dam Safety Act by providing assistance, inspecting regulated sites, and enforcing conditions required by these acts.

National Pollution Discharge Elimination System (NPDES) Program

The DWWM's primary mechanism for controlling point sources is the West Virginia NPDES permitting program. This program, administered by the Permitting Branch, regulates activities and facilities involved in the installation, construction, modification, and operation and maintenance of wastewater treatment systems as well as their discharges. Individual and general permits are used to implement the program. Most permits include effluent limits and requirements for facility operation and maintenance, discharge monitoring and reporting. Other permits require the installation and implementation of best management practices in lieu of effluent limitations and discharge monitoring requirements.

The Permitting Branch also administers a pretreatment program in conjunction with the NPDES program, which outlines procedures for regulating proposed industrial wastewater connections to publicly owned treatment works. The program imposes discharge limitations for indirect discharges and requires the installation of pretreatment facilities where necessary to prevent interference with POTW operations and sludge disposal practices and to ensure that the pollutants contributed by industrial users do not pass through the POTW and violate water quality standards. The National Combined Sewer Overflow (CSO) Policy is implemented as a component of the NPDES Permits for POTWs with CSOs. Other activities administered by the Permitting Branch include the regulation of industrial solid waste landfills and the land application of sewage sludge, and developing wasteload allocations for new or expanding sewage treatment facilities.

In addition to permitting, compliance assessment and enforcement activities are coordinated between the Permitting Branch and Environmental Enforcement. Noncompliance is initially addressed by administrative actions to compel compliance. These may include warning letters, notices to comply, enforcement orders, or referrals for civil action.

Below is a list of permit actions for the time period beginning in July 2005 and ending in June 2007.

Figure 11 - Permit action report

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
Report Date 04/16/2008

NPDES PERMITTING	- PERMIT ACTION REPORT (7/1/2005 - 6/30/2007)					Applications Pending as of 6/30/2007						
	Applications Received This Period	Applications Denied this Period	Permits Registrations and Modifications Issued This Period	Permits Registrations and Modifications Issued Year-to-Date for Current Fiscal 2008	Withdrawn and Voided This Period	Greater Than 180 dep days	Less Than, 180, > 90 dep days	Less Than, Equal to 90 dep days	Total (dep days)	Greater Than 180 total days	Average DEP Time to Issue Permits This Period (In Days)	Average Total Time to Issue Permits This Period (In Days)
INDIVIDUAL PERMITS	[illegible]	1	[illegible]	88	[illegible]	16	14	27	57	[illegible]	[illegible]	[illegible]
GENERAL PERMITS												
Home Aeration Units	[illegible]	[illegible]	[illegible]	265	[illegible]	0	0	125	[illegible]	[illegible]	[illegible]	[illegible]
Sewage General	[illegible]	[illegible]	[illegible]	12	[illegible]	0	0	14	[illegible]	4	[illegible]	[illegible]
Storm Water Construction	[illegible]	[illegible]	[illegible]	474	[illegible]	0	1	68	[illegible]	[illegible]	[illegible]	[illegible]
All Others	[illegible]	[illegible]	[illegible]	144	[illegible]	0	2	47	[illegible]	[illegible]	[illegible]	[illegible]
MODIFICATION PERMITS	[illegible]	4	[illegible]	172	[illegible]	10	8	57	[illegible]	[illegible]	[illegible]	[illegible]
TRANSFER PERMITS	[illegible]	[illegible]	[illegible]	151	[illegible]	2	1	25	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL - PERMITS	[illegible]	[illegible]	[illegible]	1304	[illegible]	28	24	363	[illegible]	[illegible]		

NOTE: The permits used to calculate for the "Average DEP Time" column are those that were submitted after June 30, 1999, when ERIS was deployed for Division of Water and Waste Management.

Clean Waters State Revolving Fund Program

Clean Water State Revolving Fund (CWSRF) program is a funding program administered by the State Revolving Fund Branch to address water quality problems through wastewater facility construction, upgrades, or expansions. The branch is charged with general oversight, fiscal management and administrative compliance review of local governmental entities that receive funds and provides information and guidance on what administrative actions are needed to process a loan through the program. When a community has been recommended by the West Virginia Infrastructure and Jobs Development Council to seek the CWSRF program for financial assistance, that community will be contacted by a financial manager. A meeting may be scheduled to advise the community leaders about the overall program requirements and specifically what they should do next to obtain a CWSRF loan. There are federal, state, and program requirements that must be met prior to scheduling a loan closing.

The CWSRF currently has three financial assistance programs available. These programs are described below.

Low Interest Loan Program

A low interest loan program for construction of municipal wastewater treatment works is available for municipalities and public service districts to build, upgrade, or expand treatment facilities and collection systems. Conventional loans with a repayment period of 20 years are available with an interest rate and annual administrative fee not exceeding 3% for certain communities. Loans with repayment periods from 21 to 40 years are available for disadvantaged communities where financial affordability is an issue. The interest rate and annual administration fee on these loans do not exceed 1/2%. From July 2005 through June 2007, twenty-two wastewater treatment facility loans totaling $102,274,781 dollars were funded.

Agriculture Water Quality Loan Program

The Agriculture Water Quality Loan Program is a partnership with the West Virginia Conservation Agency developed to address pollution from nonpoint sources using Best Management Practices approved by the U.S. Environmental Protection Agency. CWSRF money is loaned to participating banks so they can offer below market rate low interest loans to qualifying applicants. For more information, contact your local Conservation District office, http://www.wvca.us/directory/cdo.cfm. From July 2005 through June 2007, 46 nonpoint source agriculture BMP loans totaling $1,079,287 dollars were funded.

Onsite Systems Loan Program

In cooperation with the West Virginia Housing Development Fund, a new low interest loan program has been established to address onsite sewage disposal problems. Called the "Onsite Systems Loan Program," loans up to $10,000 are available to replace malfunctioning septic systems and to install new onsite sewage systems for homes that have direct sewage discharges to ditches and streams.

Nonpoint Source Control Program

Many of the streams being listed on the state's list of impaired waters are affected by nonpoint sources. The majority of the Total Maximum Daily Loads (TMDLs) being developed involve nonpoint source water quality impacts. To more effectively respond to TMDL implementation needs, the Nonpoint Source Management Plan was updated in 2000 to incorporate watershed management principles, including integration of TMDL and Watershed Management Framework scheduling. Since then, the Nonpoint Source Program has developed 16 watershed based plans that address a variety of nonpoint sources of pollution. These plans are developed in cooperation with the stakeholders, including federal, state and local government agencies, within the watershed. As a result of these plans, numerous nonpoint source remediation projects for acid mine drainage, agriculture, streambank erosion, and dirt roads have been undertaken. The goal of the watershed based plans is to restore the impaired streams to meet water quality standards. The successes to date emphasize the need to focus more resources on voluntary installation of best management practices in identified priority watersheds where local stakeholders are interested in making a difference.

The Nonpoint Source Control Program focuses on restoration and protection of streams from nonpoint source pollution. The Program assesses nonpoint source impacts, then develops and implements watershed based plans and projects designed to reduce pollutant loads from agricultural, silviciculture, resource extraction, urban runoff, construction activities, and failing septic systems. Program initiatives are based upon education, technical assistance, financial incentives, demonstration projects, and enforcement, as necessary. The division's Nonpoint Source Program supports overall administration and coordination of the nonpoint source activities through these participating state agencies: the West Virginia Conservation Agency, the Office of Oil and Gas, and the Division of Health and Human Resources. Each year, specific activities are funded under the Nonpoint Source Program.

Groundwater Program

Under the Groundwater Protection Act, West Virginia Code Chapter 22,

Eroded stream bank along Little Fivemile Creek in Mason County
Photo by Andrew Johnson

Article 12, Section 6.a.3, DEP is required to provide a biennial report to the Legislature on the status of the state's groundwater and groundwater management program, including detailed reports for each agency that has groundwater regulatory responsibility. The current biennial report to the Legislature covers the period from July 1, 2005 through June 30, 2007. This is the eighth report completed since the passage of the act in 1991. Copies of the report "Groundwater Programs and Activities: Biennial Report to the West Virginia 2008 Legislature" may be obtained by contacting the Groundwater Program at the Division of Water and Waste Management, 601 57th St., Charleston, WV 25304. The report also may be reviewed at http://www.wvdep.org/Docs/14320_2008_106_Report.pdf

The Groundwater Program is responsible for compiling and editing information submitted for the biennial report. The DEP, the West Virginia Department of Agriculture and the West Virginia Department of Health and Human Resources all have groundwater regulatory responsibility and contribute to the report. These state boards and six standing committees currently share the responsibility of developing and implementing rules, policies and procedures for the Ground Water Protection Act (1991). The Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Nonpoint Source Coordinating Committee are the standing committees. The report provides a concise, thorough overview of those programs that are charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia.

The Ambient Groundwater Quality Monitoring Network was established by the DWWM in cooperation with the USGS in 1992 and is an ongoing project. The network provides critical data needed for proper management of West Virginia's groundwater resources. The major objective of this USGS study is to assess the ambient groundwater quality of major systems (geologic units) within West Virginia and to characterize the individual systems. Characterization of the quality of water from the major systems helps to:

- Determine which water quality constituents are problems within the state
- Determine which systems have potential water quality problems
- Assess the severity of water quality problems in respective systems
- Prioritize these concerns

Only by documenting present ambient groundwater quality of the state's major systems can regulatory agencies assess whether water quality degradation has occurred in certain areas and whether potential degradation is a result of natural processes or those associated with human activity. Spatial variability in water quality is determined for specific geologic units based on sampling of approximately 30 wells annually. The sampling continues over a period of approximately six years and provides a database of more than 200 wells from which comprehensive water samples are collected. Wells are selected in specific drainage basins in given years, rotating annually to new basins, thus providing sampling of groundwater in all watersheds of the state over the five year period. Then, the cycle of sampling begins again. All associated groundwater quality data for each well sampled and summaries of groundwater quality for each respective watershed are published in the USGS Water Resources Data for West Virginia annual report.

Public Participation and Responsiveness Summary

The draft Section 303(d) List was advertised for public comment from March 24, 2008 through June 6, 2008. This period included a 30-day extension granted by the agency after requests for additional time to fully develop comment submissions were received from multiple entities. Notices of the availability of the draft document were placed in newspapers statewide, including requests for public comment. The draft document was promoted via news release, e-mail and the Internet. At the conclusion of the public comment period, DEP considered all comments and made adjustments to the list where appropriate.

Table 10 identifies all entities that provided comments. All comments have been compiled and responded to in this responsiveness summary. The DEP appreciates the efforts commenters have put forth to improve West Virginia's listing and TMDL development processes. Comments and comment summaries are bold and italicized. Agency responses appear in plain text.

Table 10 - 2008 Section 303(d) List Commenters

Argus Energy WV, LLC	McDowell County Wastewater Treatment Coalition
Appalachian Center for the Econonmy and the Environment	Mettiki Coal (WV), LLC
Consol Energy Inc.	R.E.I Consultants, Incorporated
Fola Coal Company, LLC	West Virginia Coal Association
Massey Coal Services, Inc.	

The classification of the entire length of Beaver Creek (WVMC-60-D-5) as a trout stream was disputed and the removal of iron (trout) and aluminum (trout) impairment listings was requested.

The commenter correctly stated that available water quality monitoring data for Beaver Creek does not indicate impairment pursuant to iron and aluminum criteria for warmwater fisheries and that the classification of Beaver Creek as a trout stream was based upon a non-agency, 2002 fisheries evaluation in the Beaver Creek watershed that found one adult brook trout at one Beaver Creek headwater location and no trout at two other downstream Beaver Creek locations.

Beaver Creek is located in an area of the state where unimpaired streams would be expected to support a coldwater fishery and trout. Beaver Creek is tributary to Blackwater River, which is a trout stream and the fisheries evaluation also documented the presence of brook trout in some of its tributaries. Those facts notwithstanding, Beaver Creek is subject to anthropogenic impacts, particularly those related to acid mine drainage, that jeopardize its ability to support trout.

DEP applies the trout water designated use and associated criteria to specific streams that meet the definition of "Trout waters" at 47CSR2 – 2.19:

"Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.

Alternatively, a stream that currently does not support year-round trout populations may also be properly classified as a trout water if that use was documented to be an existing use pursuant to the definition of "Existing uses" at 47CSR2 – 2.6 and the Tier 1 protection requirements of the Antidegradation Policy at 47CSR 2 – 4.1.a:

(2.6) "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included in the water quality standards.

(4.1.a.) Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.

When classifying trout waters, DEP relies heavily on the guidance of the Division of Natural Resources.

After receipt of the comment, DEP reviewed available documentation and consulted with the Division of Natural Resources. Both agencies agree that Beaver Creek was historically a trout stream, but available information is insufficient to classify the present condition of Beaver Creek as a trout stream pursuant to 47CSR2 – 2.19. Also, the lack of historical DNR trout surveys and uncertainty regarding the timing of the degradation of the use preclude evaluation of the existing use provisions of the Antidegradation Policy. As such, DEP has decided to consider the entire length of Beaver

Creek as a warmwater fishery for 303(d) and 305(b) evaluations in the 2008 cycle, and the trout water iron and aluminum impairments were removed from the Section 303(d) list. The aquatic life use classification of Beaver Creek may be revisited in future cycles if new information becomes available.

A compilation of industry-generated, stream monitoring data was provided for specific streams with a request to list selenium impairments.

The submitted data was qualified and evaluated, and the following impairments have been added to the West Virginia 2008 Section 303(d) List:

Stream Name	Code	Impairment	Impaired Reach
Sandlick Creek	WVBST-109	Selenium AQ	Entire Length
Left Fork/Right Fork/ Trace Fork	WVBST-24-K-4-A	Selenium AQ, HH*	Entire Length
Tenmile Fork	WVK-61-L	Selenium AQ, HH*	Entire Length
UNT/Tenmile Fork RM 3.98	WVK-61-L-4	Selenium AQ, HH*	Entire Length
Hughes Creek	WVK-66	Selenium AQ, HH*	Entire Length
Sixmile Hollow	WVK-66-D	Selenium AQ, HH*	Entire Length
Smithers Creek	WVK-72	Selenium AQ, HH*	Mouth to RM 5.6
Rockhouse Creek	WVKC-47-A	Selenium AQ, HH*	Entire Length

**Available water quality data indicates exeedence of the currently effective, 20 (ug/L), selenium criterion for the public water supply use. The 2008 Legislature revised that criterion to 50 (ug/L), but the revision has not yet been approved by EPA and, therefore, is not effective for Clean Water Act purposes. Upon EPA approval, available selenium water quality data will be reevaluated with respect to the public water supply use and impairment decisions will be modified as appropriate in the next listing cycle.*

Bacteria water quality data was submitted that requested the listing of fecal coliform impairments of specific streams in the Tug Fork River watershed.

The submitted data was qualified and evaluated and the following impairments have been added to the West Virginia 2008 Section 303(d) List:

Stream Name	Code	Impairment	Impaired Reach
Tug Fork (revised reach)	WVBST	Fecal Coliform	Entire Length
Dry Fork	WVBST-70	Fecal Coliform	Entire Length
Bradshaw Creek	WVBST-70-M	Fecal Coliform	Entire Length
Little Slate Creek	WVBST-70-N	Fecal Coliform	Entire Length
Clear Fork	WVBST-76	Fecal Coliform	Entire Length
Davy Branch	WVBST-85	Fecal Coliform	Entire Length
Trail Fork	WVBST-98-B	Fecal Coliform	Entire Length

The use of the West Virginia Stream Condition Index (WVSCI) in the assessment of impairment relative to aquatic life designated uses was protested. Commenters contended that the WVSCI is an inappropriate assessment mechanism because it has not been promulgated as a water quality standard by the West Virginia Legislature and has not been subjected to peer-review or public notice and comment.

The basis for biological impairment listings is the narrative water quality criterion at Title 47 Series 2 Section 3.2.i of the Code of State Rules, which prohibits significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. This narrative criterion is a valid water quality standard that was promulgated by the West Virginia Legislature and approved by the EPA.

Under the Clean Water Act and implementing regulations, DEP must assess State waters with respect to attainment of water quality standards via comparison of available information to both numeric and narrative water quality criteria. DEP initiated biological integrity assessments in the 1998 Section 303(d) list. The WVSCI was first used in the 2002 Section 303(d) listing process and has remained as an integral component of all subsequent 303(d) lists. The DEP's position has not changed relative to its responsibility to list waters where available data indicates significant adverse impact to their biological components. Furthermore, list approval by the EPA is expected to be contingent upon our continued implementation of this practice.

The WVSCI was specifically designed to accomplish assessment with respect to the 47CSR2 - 3.2.i criterion and remains the best scientific tool available to DEP for that purpose. It was developed for EPA and DEP by national experts in the assessment of biological integrity through the evaluation of benthic macroinvertebrate communities. It is similar to the multi-metric indices used by many states and its component metrics are both validated and widely used nationally when assessing biologic health of aquatic systems.

Over the long period of WVSCI application, there have been numerous opportunities for public notice and comment. Prior to the 2008 effort, the WVSCI has been applied in three West Virginia Section 303(d) lists and each of those processes included public notice and comment provisions. Previous Section 303(d) lists have generated public comments relative to biological impairment and application of the WVSCI. DEP conscientiously considered and responded to all such comments. EPA reviewed public comments and DEP responses and, in their list approvals, concluded that DEP properly assessed biological data and properly considered and responded to public comments.

Certain comments proclaimed that the Division of Water and Waste Management is being disingenuous in its assessment of the biological integrity of state waters to "inflate the list as much as possible to present a perception as the 'sky is falling' in regards to the quality of West Virginia streams and rivers," to "generate more money for future TMDL projects" and to "specifically target mining operations."

DEP does not agree with the above assertions. The current list reflects DEP's responsibility under the Clean Water Act to objectively assess use attainment in West Virginia waters. The biological assessment methodologies associated with the 2008 effort are essentially the same as those used in the preparation of 303(d) lists over the past ten years. In the very limited instances where the source of biological impairment was identified as "mining," source determinations were made through consideration of scientific information generated in TMDL development processes.

Flaws in WVSCI development were suggested regarding metric variability, failure to use a statewide dataset, lack of a sensitivity evaluation in metric selection, and an improper mechanism to select reference and impaired sites.

WVSCI was developed following the procedures outlined in the EPA guidance manual, Rapid Bioassessment Protocols for Use in Wadable Streams and Rivers (EPA 841-B-99-002). It included a determination of the metrics that best discriminated between reference and stressed benthic communities (determined abiotically). These metrics were reduced down to six distinct metrics so that the variability of metrics is minimized. DEP revised the best standard values for each of the six metrics in 2001 after collecting benthic macroinvertebrate data from throughout the state. Evaluation of sensitivity was addressed by selecting those metrics with the highest discrimination efficiencies (i.e., those that are most sensitive to stressors). The reference and stressed streams were selected based on several abiotic criteria, resulting in groups of benthic communities that would be expected to have different characteristics. It would be inappropriate to use data from all streams in the metric selection process. However, all data was used in determining best standard values for scoring individual metrics.

It was suggested that DEP should not use a single biological sampling event at a single sampling location to assess the biological integrity of an entire stream reach, because biological communities are subject to substantial variability and a single sampling event may reflect a recent drought, a scouring flood, or localized impact. An alternative methodology that incorporates multiple collections and consideration of the magnitude and frequency of exceedances was suggested.

Given the magnitude of the DEP's responsibilities for watershed assessment, it would not be practical to demand multiple biological monitoring events at a single location prior to assessment. The design of the WVSCI allows an individual sample, qualified as comparable per its methodology, to discriminate departure from the reference condition and to be used for impairment decisions pursuant to the narrative criterion of 47CSR 2 - 3.2.i.

The DEP does not conduct a biological assessment when suspect conditions jeopardize the validity of assessment under the WVSCI. For example, if it is known that streams have been dry for extended periods or have been scoured by a recent flood, the DEP does not perform biological monitoring. Additionally, to be considered comparable, the depth of sample areas cannot be greater than the height of the net and the flow must be sufficient to carry dislodged macroinvertebrates into the net. All biological monitoring data is extensively screened for comparability to WVSCI thresholds before it is used.

In many instances, multiple biological assessments at varying points along a stream's continuum are not available. In streams with severely limited assessment locations, DEP assumes the biological condition measured at a specific location is maintained in both upstream and downstream directions until contradicted by another measurement. "Entire length" is the default segment for an impairment determined by a single assessment at a single location, but segmentation does occur when a sufficient number of samples sites are available and the data provide a clear distinction between impaired and non-impaired segments.

TMDL development for biological impairment is preceded by an intensified monitoring and source assessment effort, under which biological condition is reevaluated and information necessary to refine impaired reaches and identify stressors and thresholds is generated. Previous biological listings without specification of stressors or sources have not directly impacted permitted facilities, and pollutant reductions have been directed only after causative sources have been determined and TMDLs have been developed, and only for sources that contribute pollutants associated with identified biological stressors.

Benthic macroinvertebrate data for streams in the East Fork of Twelvepole Creek watershed were provided with requests that the data be deemed accurate and valid, and that the data be accepted by DEP and considered in listing decisions, particularly in the segmentation of biologically impaired waters. Additionally, the commenter requested that DEP accept the validity and accuracy of the WVSCI score as calculated from rarefied, whole kick-net samples with equal credence as the WVSCI calculated from 200-organism count kick-net subsamples.

DEP performed an initial review of the submitted data and then arranged and conducted a field visit with the commenter to evaluate sampling methodology and the suitability of sampling locations. DEP also requested and received specific benthic macroinvertebrate collections to evaluate the proficiency of the commenter's taxonomic identification.

In general, appropriate riffle/run habitats were observed at the field-reviewed sampling locations. The commenter's descriptions of field sampling, laboratory sorting and sub-sampling methodologies were consistent with the WVSCI protocols for the most-recent collections (October 2007). Sampling methodology prior to October 2007 was described as a "whole kick" sample from which all benthic macroinvertebrates were identified; assemblages generated under this methodology required rarefication to be comparable to the WVSCI index. Concern was noted with the commenter's October 2007 sampling. The described practice of benthic collection after a period of extended drought would not provide WVSCI comparable assemblages if stream channels were dry for a two-to-three month period prior to collection.

In DEP's pursuit of taxonomic identification validation, the agency was advised by the data provider that the submitted assemblages were not saved in a manner appropriate for re-evaluation. As such, validation was procluded and the data was not used in the impairment assessemnts for the 2008 303(d) List. The provider committed to improve quality assurance and quality control procedures for sampling, sorting, identification and storage of benthic macroinvertabrate samples that would allow data to be used in future assessment cycles. DEP will work with the provider in that regard and is agreeable to joint assessment activities in the subject streams and watersheds.

A second commenter provided the same benthic macroinvertebrate data, but requested the delisting of the following biologically impaired streams: East Fork Twelvepole Creek (RM 4.4 to RM 10.5), East Fork Twelvepole Creek (RM 25.1 to HW), Kiah Creek, Right Fork Cub Branch, Copley Trace Branch, Honey Branch, Parker Branch, Rollem Fork.

The requests were based upon general arguments that the use of the WVSCI is inappropriate and that insufficient data exists to assess biological impairment, and included one or more of the following points:

- ❶ ***Impairment decisions should not be based upon old assessments.***
- ❷ ***The WVSCI methodology should not be applied downstream of ponds or lakes because the impairment may be caused by the impoundment (and not by a pollutant).***
- ❸ ***The WVSCI methodology should not be applied to previously mined areas or to shortened stream segments below valley fills.***

❹ ***Impairment determinations should not be made based upon a single assessment, because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment" and because of the high spatial and temporal variability demonstrated in the commenter's dataset.***

Some of the subject biological impairment listings had assessments performed by DEP in calendar year 2000 and were first listed on the 2002 Section 303(d) list. The ages of the assessments are recognized, but the subject impairments were promptly listed on the next Section 303(d) list after assessment results became available. New data demonstrating non-impaired conditions is not available. EPA closely evaluates the removal of waters from the 303(d) list without TMDL development. Excluding extenuating circumstances such as a criterion change or a determination that the original listing was made in error, delisting is approvable only where new information demonstrates attainment of water quality standards. TMDL development is preceded by a comprehensive water quality and biological monitoring effort. If new monitoring indicates that a stream is not impaired, then TMDL development will not be initiated and the new data will be used to support delisting of the impairment in the next available Section 303(d) List.

For some of the waters for which delisting was requested, a component of the argument involved the presence of impoundments in the watershed and an implication that the observed biological impairments might be caused by the impoundment rather than by pollutants in the water. DEP recognizes that impairments that are not caused by a pollutant need not be included on the Section 303(d) list. In the Integrated Report format, such impairments can be placed in Category 4C rather than Category 5. Applicable EPA guidance states that waters should be listed in relation to biological assessments unless the state can demonstrate that non-pollutant stressors ***cause*** the impairment or that ***no*** pollutant(s) causes or contributes to the impairment. While DEP accepts that the upstream habitat alteration associated with impoundments might negatively impact downstream biological scores, seldom is there sufficient information to properly discern the causative stressors at the time of assessment and listing. Uncertainty of the causative source of biological impairment at the time of assessment, as is most often the case, is not a sufficient reason to exclude the impairment from the 303(d) list. Consistent with EPA guidance, DEP lists waters as biologically impaired if available monitoring results fall below the WVSCI threshold. Causative stressors are identified at the front end of the TMDL development process. If the stressor identification process determines that a pollutant does not cause the impairment, then a TMDL will not be developed. In regard to this issue, the methodologies employed in the 2008 process are identical to those approved in the three previous 303(d) lists.

The commenter suggested the WVSCI methodology should not be applied to previously mined areas or to shortened stream segments below valley fills. Assessment of the 47CSR2-3.2.i criterion via the WVSCI methodology is appropriate in wadable waters of the state, provided that a comparable riffle/run habitat is available. The narrative criterion is equally applicable as the numeric water quality criteria that drive "criteria end-of-pipe" permit limitations in the discharges from instream treatment structures. There is no mechanism to remove water quality standard applicability in streams "on previously mined and permitted areas" or in stream reaches downstream of valley fills or sediment control ponds.

The commenter also contends that biological impairment determinations should not be made based upon a single assessment because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment" and because of the high spatial and temporal variability demonstrated in the commenter's dataset. WVSCI variability has been measured and addressed in the listing methodology. Duplicate sampling (2 samples collected at the same location and time) has been a routine component of DEP's biological monitoring program since the initiation of WVSCI implementation. The observed variability forms the basis for a precision estimate that, in turn, creates the "gray zone" concept that is applied in the listing methodology for biological impairment. Streams with WVSCI scores falling below the true impairment threshold of 68 (5th percentile of reference) and above 60.6 (5th percentile of reference minus the precision estimate) are not initially listed but are targeted for re-evaluation. Because a gray zone WVSCI result does not provide sufficient information for classification of aquatic life use attainment, DEP also does not interpret it as a demonstration of improved biological condition in delisting decision-making.

Temporal variability of WVSCI reference sites has also been evaluated. Multiple biological resampling events have been performed at reference stations. The unchanged watershed conditions and consistent WVSCI scores demonstrate acceptable variability and reproducibility of the WVSCI methodology. Conversely, WVSCI temporal variability cannot be effectively assessed in disturbed watersheds without specific knowledge of changing watershed activities that may impact biological condition.

As described in the response to the previous comment, the commenter's submitted dataset could not be validated. As such, the purported, extreme WVSCI variability cannot be substantiated with the data submitted.

DEP maintains that the WVSCI protocol for assessment of the 47CSR2-3.2.i criterion is scientifically sound and that the arguments presented by the commenter do not support its abandonment.

A request was received to revise the impaired reach of Rollem Fork (WVO-2-Q-18-E) because of the presence of instream ponds in the watershed.

A field investigation of Rollem Fork confirmed the presence of the first instream pond at approximate mile point 0.9. As such, the biological impairment indicated by the benthic macroinvertebrate collection near the mouth of Rollem Fork was considered to be representative of the stream segment between the mouth and milepoint 0.9. The impaired reach of Rollem Fork was revised from 1.9 miles to 0.9 miles in the Section 303(d) list.

A request was received to delist the biological impairment for Open Fork (WVO-2-Q-27). A previous biological assessment indicated an unimpaired condition near the mouth of the stream, whereas a new assessment at mile point 0.9 indicated impairment. DEP was advised that the more recent assessment location appears to be within a sediment pond such that the collected assemblage is not comparable to the WVSCI.

The more recent biological assessment of Open Fork was conducted under the probabilistic monitoring program. Under that program design, specific sampling sites are selected randomly by computer. To maintain program integrity, pre-selected sites are not relocated in the field. After receipt of the comment and evaluation, DEP concurs that the sampling location is located immediately upstream of a pond and could have been periodically inundated with backwater prior to sample collection. As such, uncertainty exists regarding the comparability of the collected assemblage and the impairment was removed from the Section 303(d) list.

Delisting of the manganese impairment of Kiah Creek (WVO-2-Q-18) was requested. The commenter stated that most of the observed manganese exceedances in the dataset upon which the listing decision was based occurred in 2003, and very low level exceedances were reported on 10/1/04 and 8/21/06. An anomaly associated with the specific conductance value reported for the 8/21/06 sampling event was identified and, due to that anomaly, the validity of the overall dataset was questioned. The commenter also provided additional manganese water quality data collected in Kiah Creek at approximate milepoint 3.1 that indicates a non-impaired condition.

The water quality data available for the original assessment was that which was generated by the Division of Mining and Reclamation in the "Trend Station" monitoring program. The zone of applicability of the manganese criterion in Kiah Creek is from the mouth upstream 3.3 miles. The trend station is located 0.6 miles upstream of the mouth. The original assessment and listing conformed with the listing methodology in that greater than 10% of the available manganese results (6/51) exceeded the criterion value over the data evaluation period associated with the 2008 effort (July 1, 2002 – June 30, 2007).

Upon receipt of the comment, DEP specifically re-evaluated the August 21, 2006 Trend Station analytical results but could not conclude that the low specific conductance reported for that date should disqualify the measured manganese concentration. DEP evaluated and accepted the commenter's additional manganese data collected at milepoint 3.1. Furthermore, DEP determined that no additional manganese sources are present in the Kiah Creek watershed downstream of milepoint 3.1 and that the manganese concentrations in Kiah Creek should not differ appreciably between the commenter's sampling location and that of the Trend Station. The newly submitted data was combined with that from the Trend Station and reassessed. The recalculated exceedance rate did not meet the impairment threshold of the listing methodology and a Kiah Creek manganese impairment was not included on the Section 303(d) list.

One commenter provided references to the Programmatic Environmental Impact Statement for Mountaintop Mining and Valley Fills in Appalachia (MTM/VF EIS), a supplemental study supplied by a member of the coal industry, and an academic study published after the MTM/VF EIS. The commenter contended that the referenced

documents show that mountain top mining and valley fills do not cause biological impairment and therefore, DEP's assessment of biological impairment through the use of the WVSCI is flawed. Based upon the supplemental studies, the commenter characterized the WVSCI as a "measure of change, not impairment" and opined that "a mere shift" in the biological community should not be equated to impairment because the designated use of the stream remains viable.

The following reference to the MTM/VF EIS was provided:
Further, the EIS studies did not conclude that impacts documented below MTM/VF operations cause or contribute to significant degradation of waters of the U.S. (Programmatic Environmental Impact Statement. Corps, EPA et.al. Pg. II. D-9).
The overwhelming majority of biological impairment listings in the 2008 West Virginia Section 303(d) List do not have associated sources identified and, in no instances, are the specific mining activities evaluated in the MTM/VF EIS identified as source of biological impairment. More importantly, the referenced statement, extracted from thousands of pages of documentation, does not wholly reflect the findings of the MTM/VF EIS.

The MTM/VF EIS clearly recognizes biological impairment in certain waters downstream from evaluated mining activities, as evidenced by the following language that is contained within the same paragraph as the referenced statement:

Biological conditions in the streams with only valley fills represented a gradient of conditions from poor to very good; streams with valley fills and residences were most impacted. Impacts could include several stressors, such as valley fills, residences, and/or roads.

The recognition of biological impairment is also evidenced in the Responses to Comments section of the MTM/VF EIS:

Studies do indicate that aquatic communities downstream of surface coal mining operations and valley fills are impaired in some cases. Certain chemical parameters (sulfates, specific conductance, selenium) are sometimes elevated downstream of mining or valley fills. Stream reaches below mining and valley fills may have changes in substrate particle size distribution from increased fine material due to sedimentation. Some macroinvertebrate communities change in terms of diversity, population size, and pollution tolerance. However, the sample size and monitoring periods conducted for the PEIS were not considered sufficient to establish firm cause-and-effect relationships between individual pollutants and the decline in particular macroinvertebrate populations. Impairment could not be correlated with the number of fills, their size, age, or construction method. See Section II.C. Action 5 in the PEIS recognizes the value of continued evaluation of the effects of mountaintop mining operations on stream chemistry and biology.

In regard to the supplemental studies, the MTM/VF EIS clearly indicates that the opinions and views expressed by the individual authors of referenced studies do not necessarily reflect the position or view of the agencies preparing the EIS. DEP does not interpret the cited studies as demonstrations of universal biological integrity in streams below evaluated activities and disagrees with the commenter's characterization of the WVSCI. A "shift" in the benthic macroinvertebrate community of a stream can constitute biological impairment pursuant to 47CSR2 – 3.2.i, and the WVSCI (recognized as a "best science method" in the MTM/VF EIS) provides a sound scientific basis for assessment.

It was contended that an inaccurate acute-to-chronic ratio was used in EPA's water quality criteria development for chloride, that if rectified would increase the chloride chronic criterion from 230 mg/l to 441 mg/l.
The West Virginia 2008 Section 303(d) List is based upon the currently effective water quality standards. Impairment assessments must compare water quality data and information to the currently effective chronic criterion for chloride (230 mg/l). Future requests for criteria revisions can be considered by DEP, but must be adopted by the Legislature and approved by EPA before they become effective.

The identification of "mining" as the source of impairment for the streams included on the 303(d) list was discouraged. Commenters urged consideration of all potential sources of biological impairment instead of targeting the mining industry and requested that source identification be withheld until stressor identification is performed in TMDL process.
The West Virginia 2008 Section 303(d) list attributes only 17 of 574 biological listings and 7 of 585 numeric water quality listings to mining. DEP recognizes that there are multiple possible sources of biological

impairment and identifies sources as unknown for most initial listings.

However, all of the biologically impaired streams with “mining” identified as the source have undergone stressor identification in a TMDL development process. For each stream, the stressor identification process has identified ionic toxicity as a significant stressor. As documented in each TMDL report, DEP decided to defer biological TMDL development until better information became available regarding the causative pollutants and their associated impairment thresholds, and retained those waters on the Section 303(d) list. In each case, water quality data indicates elevated conductivity and sulfates contributed by mining discharges. Additionally, land use in affected watersheds is overwhelmingly dominated by mining activities. Many of the watersheds have no logging operations, oil and gas wells, or houses.

“Mining” is also identified as source of chloride impairment in seven streams. Each stream is a receiving stream for active mining discharges which exceed appropriately calculated water quality-based effluent limitations. The permittee has sought, but has not been granted, variances from the applicable chlorides water quality criteria. As such, the sources of the chlorides impairment are clear. Those same streams are biologically impaired and it is likely that ionic stress will be identified as a stressor in the TMDL development process. However, since the TMDL-based stressor identification is not yet final, the sources of the biological impairments are specified as “unknown.”

Specific requests were received to delist biological impairments for Boardtree Branch (WVKG-5-M) and Stillhouse Branch (WVKG-5-O) and/or to identify the sources of biological impairment as unknown until such time that stressor identification is performed in the TMDL process. The commenter indicated that the biological impairments of the subject streams might be related to habitat deficiencies or influences other than mining operations.

The requested stressor identification process was accomplished during the development of TMDLs for the Gauley River watershed (approved March 2008). The stressor identification process involved a thorough evaluation of water chemistry, habitat, and the benthic macroinvertebrates collected. Under that process, ionic toxicity was identified as the most important biological stressor in each stream. In addition to the ionic toxicity, instream habitat impacts related to manganese precipitation and substrate fusion were also documented.

The streams were sampled between July 2003 and June 2004, as a component of the “Pre-TMDL” monitoring program for the Gauley River watershed. In addition to biological and habitat assessments, monthly water quality samples for multiple pollutant parameters were collected and analyzed. The water quality data for both streams indicates extremely elevated conductivity and sulfates contributed by mining discharges. Over the pre-TMDL sampling period, specific conductance in Boardtree Branch ranged from 2544 to 3341 (umhos/cm) and sulfates ranged from 1575 to 2307 (mg/l). In Stillhouse Branch, specific conductance ranged from 2678 to 3964 (umhos/cm) and sulfates ranged from 1673 to 2915 (mg/l).

Both streams were first identified as biologically impaired on the 2006 West Virginia Section 303(d) list. As described previously, DEP decided to defer biological TMDL development until better information became available regarding the causative pollutants and impairment thresholds associated with ionic stress, and retained those waters on the Section 303(d) list.

Stoneflies were completely absent in the biological assemblages collected in both streams and Stillhouse Branch contained zero mayflies. The severe impacts to those important insect orders are not observed in relation to the alternative stressors suggested by the comment. The landuse assessment conducted in the TMDL process indicates active mining accounts for 99.32% and 99.63% of the Boardtree Branch and Stillhouse Branch watersheds, respectively. The negligible presence of non-mining activities, the predominant contribution of ions from the mining discharges and the mining related habitat impacts clearly support the identification of “mining” as the source of the biological impairments.

The biological impairments of the subject streams have been retained on the Section 303(d) list.

U.S. EPA Approval and Resultant Revisions

The DEP submitted an initial report to the EPA Region III offi ce on October 17, 2008. This submission contained revisions based on EPA ‘s review of the draft 303(d) document noticed for public comment. In addition, EPA Region III provided e-mail comments on subsequent issues that arose during their review of the October 17 submittal. The DEP made necessary revisions and resubmitted the document to EPA Region III on December 5, 2008. The EPA determined the report, as revised, met the applicable requirements of Section 303(d) of the Clean Water Act. EPA approved West Virginia’s 2008 Section 303(d) list on January 16, 2009.

A copy of the EPA approval letter and rationale follows, along with DEP’s submission letters from October 17 and December 5, 2008. EPA’s Approval Rationale documents the applicable statutory and regulatory requirements and explains how West Virginia’s 2008 Integrated Water Quality Monitoring and Assessment Report complies with each requirement.

NOTE: The contents of the letters have not been altered in any way, but have been reformatted to fit this document. Actual signed copies of the letters are available upon request.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Mr. Scott Mandirola, Acting Director
Division of Water and Waste Management
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, West Virginia 25304-2345

Dear Mr. Mandirola:

Thank you for the West Virginia Department of Environmental Protection's (WVDEP) final submission on October 21, 2008, of its identification of waters under Section 303(d) of the Clean Water Act (2008 Section 303(d) List).

The U.S. Environmental Protection Agency (EPA), Region III, has reviewed the submission and supporting documentation and, pursuant to Section 303(d) of the Act, 33 U.S.C. §1313(d), hereby approves West Virginia's 2008 Section 303(d) List of water quality limited segments still requiring a Total Maximum Daily Load (TMDL). The enclosed narrative provides an explanation of the basis for EPA's approval.

Thank you again for this submission. If you or your staff have any questions, please feel free to contact Mr. Larry Merrill at 215-814-5452, or Ms. Jennifer Sincock at 215-814-5766 for assistance.

Sincerely,

Signed January 16, 2009
Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Patrick Campbell, WVDEP DWWM
David Montali, WVDEP DWWM

Approval Rationale
West Virginia Department of Environmental Protection
2008 Section 303(d) List

Introduction

U.S. Environmental Protection Agency (EPA) has conducted a complete review of West Virginia's 2008 Section 303(d) List and supporting documentation and information. Based on this review, EPA has determined that West Virginia's list of water quality limited segments ("WQLSs") still requiring Total Maximum Daily Loads (TMDLs) meets the requirements of Section 303(d) of the Clean Water Act (CWA or "the Act") and EPA's implementing regulations. Therefore, by this order, EPA hereby approves West Virginia's 2008 Section 303(d) List. The statutory and regulatory requirements, and EPA's review of West Virginia's compliance with each requirement, are described in detail below.

Statutory and Regulatory Background

Identification of WQLSs for Inclusion on Section 303(d) List

Section 303(d)(1) of the Act directs the states to identify those waters within their jurisdiction for which effluent limitations required by Sections 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The Section 303(d) Listing requirement applies to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of Section 303(d).

EPA regulations provide that states do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the Act; (2) more stringent effluent limitations required by state or local authority; and (3) other pollution control requirements required by state, local, or Federal authority. See 40 CFR §130.7(b)(1).

West Virginia developed an Integrated Report which identifies the assessment status of all of West Virginia's waters combining EPA's Section 303(d) and Section 305(b) requirements. The Integrated Report compartmentalized the waters of West Virginia into five distinct categories. All stream segments or assessment units fall into one of the following categories:

- Category 1 – Fully supporting all designated uses.
- Category 2 – Fully supporting some designated uses, but insufficient or no information exists to assess the other designated uses.
- Category 3 – Insufficient or no information exists to determine if any of the uses are being met.
- Category 4 – Waters that are impaired or threatened but do not need a TMDL.
- Category 4a – waters that already have an approved TMDL, but are still not meeting standards.
- Category 4b – waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses.

- Category 4c – waters that have been determined to be impaired by pollution or other natural factors.
- Category 5 - Waters that have been assessed as impaired and are expected to need a TMDL.

West Virginia's Section 303(d) List of impaired waters is in Category 5 of West Virginia's 2008 Integrated Report. West Virginia also provided the 2008 Section 303(d) List in the same format as the 2006 Section 303(d) List consisting of the Section 303(d) List of impaired waters and six supplemental tables that track previously listed waters. The format of the 2008 Section 303(d) List follows the Watershed Management Framework with five hydrologic groups (A-E). Within each hydrologic group, watersheds are arranged alphabetically and impaired waterbodies are listed alphabetically within their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criteria, the source of the impairment (where known), the impaired size (or, by default, the entire length), the reach description, the projected timing of TMDL development and whether or not the stream was on the 2006 list.

Six supplemental tables were provided to track previously listed waters that are not present on the 2008 Section 303(d) List. "Supplemental Table A - Previously Listed Waters – No TMDL Developed" is a list of previously listed waters which have been reevaluated and determined not to be impaired and, therefore, not in need of a TMDL. Causes for revision of the impairment status include recent water quality data demonstrating improved water quality condition, revision to the water quality criteria associated with the previous listing, or a modification of the listing methodology. Decisions regarding the need for TMDL development were made in accordance with the requirements of 40 CFR §130.7(b)(1) and the state's listing criteria. In the Integrated Report, these waters have been moved from Category 5 to Category 1, 2, 3, or 4, as appropriate.

"Supplemental Table B - Waters with TMDLs Developed" is a list of previously listed impaired waters for which a TMDL has been developed and approved by EPA. Waters included in this supplement have had a TMDL developed, but water quality improvements are not yet complete and/or documented. Since the Section 303(d) List is a list of water quality limited segments still requiring TMDLs (see 40 C.F.R. §130.7(b)), EPA's Integrated Water Quality Monitoring and Assessment Report Guidance recommends classification of such waters in a category separate from the Section 303(d) List. The West Virginia Department of Environmental Protection (WVDEP) developed this supplemental table to track previously listed impaired waters for which TMDLs have been developed. In the Integrated Report, these waters have been listed in Category 4a, which includes waters that already have an approved TMDL but are not meeting standards. Supplemental Table B has a sublist called "Supplemental Table B1 – 2007 TMDLs," which is a list of previously listed waters for which a TMDL was developed and are awaiting EPA approval.

"Supplemental Table C - Water Quality Improvements" is a list of previously listed impaired waters with improved water quality due to TMDL implementation or pre-TMDL stream restoration work that resulted in delisting. These waters are included in Category 1 (meeting all uses), provided that impairments for other uses or pollutants are not present.

"Supplemental Table D - Impaired Waters - No TMDL Development Needed" is a list of impaired waters for which either other control mechanisms are in place to control pollutants or the water is impaired by pollution (i.e., flow alterations caused by mining). These are the same waters contained in Category 4b and 4c, respectively.

"Supplemental Table E - Total Aluminum TMDLs Developed" is a list of previously listed impaired waters for which a total aluminum TMDL has been developed and established by EPA. Due to the criteria change from total aluminum to dissolved aluminum, West Virginia placed total aluminum TMDLs on a separate table from Supplemental Table B. All waters contained on Supplemental Tables B and E are included on Category 4a of the Integrated Report.

"Supplemental Table F – New Listings for 2008" is a list of impaired waters that were not previously included on the 2006 Section 303(d) List.

Consideration of Existing and Readily Available Water Quality-Related Data

In developing Section 303(d) Lists, states are required to assemble and evaluate all existing and readily available water quality-related data and information; including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or as threatened, in the state's most recent Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any Section 319 nonpoint assessment submitted to EPA. See 40 CFR §130.7(b)(5). In addition to these minimum categories, states are required to consider any other data and information that is existing and readily available. EPA's 1991 Guidance for Water Quality-Based Decisions describes categories of water quality-related data and information that may be existing and readily available. See Guidance for Water Quality-Based Decisions: The TMDL Process, EPA Office of Water, Appendix C (1991) (EPA's 1991 Guidance). While states are required to evaluate all existing and readily available water quality-related data and information, states may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring states to assemble and evaluate all existing and readily available water quality-related data and information, EPA regulations at 40 CFR §130.7(b)(6) require states to include as part of their submissions to EPA, documentation to support decisions to rely or not rely on particular data and information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; and (3) any other reasonable information requested by the Region. West Virginia's 2008 Integrated Water Quality and Assessment Report identified the state's assessment methodology and its use of data.

Priority Ranking

EPA regulations also codify and interpret the requirement in Section 303(d)(1)(A) of the Act that states establish a priority ranking for listed waters. The regulations at 40 CFR §130.7(b)(4) require states to prioritize waters on their Section 303(d) Lists for TMDL development, and also to identify those WQLSs targeted for TMDL development in the next two years. In prioritizing and targeting waters, states must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. See Section 303(d)(1)(A). As long as these factors are taken into account, the Act provides that states establish priorities. States may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs, vulnerability of particular waters as aquatic habitats, recreational, economic and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. See 57 Fed. Reg. 33040, 33045 (July 24, 1992) and EPA's 1991 Guidance.

Analysis of West Virginia's Submission

Identification of Waters and Consideration of Existing and Readily Available Water Quality-Related Data and Information

EPA has reviewed West Virginia's submission, and has concluded that West Virginia developed its 2008 Section 303(d) List in compliance with Section 303(d) of the Act and 40 CFR 130.7. EPA's review is based on its analysis of whether West Virginia reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed.

A. Description of the methodology used to develop this list, Section 130.7(b)(6)(i)

West Virginia's 2008 Section 303(d) List was developed using all existing and readily available data. In West Virginia, the WVDEP's Division of Water and Waste Management (DWWM) is responsible for the collection and compilation of this information. In preparation for the Section 303(d) Listing process, WVDEP sought water quality information from various state and Federal agencies, colleges and universities, and private individuals, businesses and organizations. News releases and public notices were published in state newspapers and letters were sent to state and Federal agencies known by WVDEP to be generators of water quality data.

West Virginia's Section 303(d) List is based largely on the data collection and assessment that underlies the §305(b) report of the state's water quality. WVDEP generated the majority of available surface water quality data through the Watershed Assessment Program (WAP) performed within the Watershed Management Framework cycle. Biological data sources included WV Stream Condition Index (WVSCI) scores collected during WVDEP's WAP. Additional data was obtained from state and Federal agencies, local environmental agencies, colleges, and universities, citizen monitoring groups, and private firms. A complete list of data providers is shown on Table 4 of the Integrated Report. West Virginia considered all data and information regarding §130.7(b)(5) categories, which is the minimum required by Federal regulations.

Data evaluation by the agency began in the fall of 2007. In-house personnel possessing varying areas of expertise compared instream data to applicable water quality criteria and determined the impairment status of state waters. The basis for §303(d) Listing decisions relates to the West Virginia water quality standards. In general terms, if water quality standards are exceeded, a waterbody is considered impaired, placed on the §303(d) List, and scheduled for TMDL development. More specifically, a waterbody is considered impaired when it does not attain the designated use assigned to it by applicable water quality standards. Use attainment is determined by comparison of the instream values of various water quality parameters to the numeric or narrative criteria contained in the standards. The West Virginia water quality standards are codified at 46 CSR 1 – Legislative Rule of the Environmental Quality Board - Requirements Governing Water Quality Standards, and at 60 CSR 5 - Legislative Rule of the Department of Environmental Protection – Antidegradation Implementation Procedures. The 46 CSR 1 version used to develop the 2008 Section 303(d) List went into effect July 1, 2008. All water quality standards contained in this version have received the EPA's approval and are currently considered effective for CWA purposes.

In addition, West Virginia provided its rationale for not relying on particular existing and readily available water quality-related data and information as a basis for listing waters. West Virginia DWWM staff evaluated data from internal and external sources to ensure that collection and analytical methods, quality assurance/quality control and method detection levels were consistent with approved procedures. All qualified data from available sources were used in the decision making process. For the stream quality assessment, West Virginia generally used water quality data generated between July 2002 and June 2007. EPA finds West Virginia's screening protocol and criteria described in its 2008 Section 303(d) listing rationale narrative to be a reasonable rationale in determining the usage of outside data, as waters listed as "impaired" should be based on scientifically valid data.

West Virginia released the Draft 2008 Section 303(d) List for public comment on March 24, 2008 through June 6, 2008. Notices of the availability of the Draft 2008 Section 303(d) List were placed in newspapers statewide and promoted via e-mail and the internet. These notices included information on where to obtain the documents and where to send comments. On March 24, 2008, the WVDEP provided EPA with the §303(d) Decision Database which records listing decisions for all waterbodies. After review of the §303(d) Decision Database, EPA provided comments to WVDEP on August 1, 2008, requesting clarification of individual waterbody listings and if any data and/or waters were screened out not used to make listing impairment decisions based on single pollution events. West Virginia received written comments from nine entities including EPA. WVDEP evaluated all comments received and prepared a responsiveness summary detailing WVDEP's actions regarding these comments. EPA concludes that WVDEP properly considered and responded to relevant public comments.

EPA received WVDEP's final 2008 Integrated Water Quality Monitoring and Assessment Report package combining the Section 303(d) List and Section 305(b) report on October 21, 2008. This package included: (1) a listing rationale narrative describing: (a) an overview of the process for development of the 2008 Integrated Report; (b) the assessment methodologies for the following kinds of data: numerical water quality criteria data including fecal coliform and pH, biological impairment, and fish consumption advisories; and (c) an explanation of the data evaluated in the preparation of the list; (2) a summary of comments and responses that could affect the listing of waters; (3) the Section 303(d) List with six supplemental tables tracking previously listed waters; (4) spreadsheets containing information on stream segments in each of the five assessment categories; (5) WVDEP's 303(d) Decision Database which records final listing decisions; and (6) all comment letters received by WVDEP during the public comment period.

West Virginia received comments questioning listing decisions for particular waterbodies. Where commentors advocated for or against particular impairment listings, West Virginia responded to the comments by providing relevant waterbody-specific analyses used in the listing decision; and, where appropriate, making changes to the Section 303(d) List.

EPA recognizes that WVDEP received comments questioning its reliance on biological assessments and the West Virginia Stream Condition Index to identify waters for inclusion on the Section 303(d) List. In identifying water quality limited segments for inclusion on the Section 303(d) List, states must evaluate attainment with water quality standards established under Section 303(c) of the Act, including numeric criteria, narrative criteria, waterbody uses, and antidegradation requirements, based on consideration of all existing and readily available information, including but not limited to assessment information such as chemistry, toxicity, or ecological assessment. Assessment information is particularly important for determining whether a waterbody is achieving its designated use, such as supporting aquatic life, or narrative criteria.

With respect to the various types of assessment information, EPA recommends that the states apply a policy of independent application to determine whether a waterbody is achieving applicable water quality standards. This policy addresses three types of assessment information:

chemistry, toxicity testing results, and ecological assessment. Each of these three methods can provide a valid assessment of non-attainment of a designated use and each independently can provide conclusive evidence of non-attainment without confirmation with a second method. EPA, Final Policy on Biological Assessments and Criteria (June 19, 1991); see also 48 Fed. Reg. 51,400, 51,402 (Nov. 8, 1983) (noting that biological monitoring is one method of testing compliance with narrative criteria); cf. 33 U.S.C. 1313(c)(2)(B) (nothing in Section 303(d) should be construed to limit or delay the use of effluent limitations or other permit conditions based on or involving biological monitoring or assessment methods). Biological assessments can provide compelling evidence of water quality impairment because they directly measure the aquatic community's response to pollutants or stressors, and they can help provide an ecologically based assessment of the compliance status of a waterbody. Memorandum from Geoffrey H. Grubbs, Director, Assessment and Watershed Protection Division, EPA, to Water Management Division Directors, Regional TMDL Coordinators, Regions I-X re Guidance for 1994 Section 303(d) Lists (Nov. 26, 1993).

Following EPA's review of WVDEP's final 2008 Section 303(d) List, EPA identified some additional concerns for which clarification and/or additional listings were provided by WVDEP in subsequent correspondence. West Virginia provided additional information to address EPA's comments and certain discrepancies identified by WVDEP. An electronic copy of West Virginia's revised 2008 Integrated Report combining the Section 303(d) list and Section 305(b) report with associated databases were received by mail on December 17, 2008.

EPA has reviewed West Virginia's description of the data and information it considered, its methodology for identifying waters, and additional information provided in response to comments raised by EPA. EPA concludes that the state properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 CFR §130.7(b)(5).

B. Description of the data and information used to identify waters, including a description of the data and information used by West Virginia as required by Section 130.7(b)(5).

1. Section 130.7(b)(5)(i), Waters identified by West Virginia in its most recent Section 305(b) report as "partially meeting or not meeting designated uses, or as threatened."

West Virginia's 2008 Section 303(d) List was combined with the §305(b) report to form what is now referred to as the Integrated Report. Therefore, the §305(b) report is no longer a stand alone document, and the data that would have gone into development of such a "stand alone" report was used in the production of the Integrated Report. In West Virginia, the biennial water quality assessment is conducted by the WVDEP DWWM. The Integrated Report incorporates the data and evaluations obtained from state and Federal agencies, local environmental agencies, colleges and universities, citizen monitoring groups, and private firms. A complete list of data providers is shown in Table 4 of the Integrated Report. West Virginia relied heavily on ORSANCO's 2006 §305(b) report and used support information when making listing decisions for the Ohio River and the tributaries for which data was available. West Virginia's Integrated Report compartmentalized the waters of West Virginia into five distinct categories which were described above. Waters are defined as being either supporting of all uses, supporting of all uses for which assessment occurred, lacking data for a determination, impaired but not requiring a TMDL, or impaired and requiring a TMDL.

Waters in Category 5, impaired and requiring a TMDL, are those placed on West Virginia's 2008 Section 303(d) List. These waters are found as not attaining their designated uses based on monitoring data. The methodology used to determine non-attainment of designated uses is described in West Virginia's 2008 Integrated Water Quality and Assessment Report. West Virginia also provided the Section 303(d) List with five supplemental tables that track previously listed waters.

2. **Section 130.7(b)(5)(ii), Waters for which dilution calculations or predictive models indicate non-attainment of applicable water quality standards.**

West Virginia relied primarily on water quality monitoring data described above in identifying impaired segments. However, certain waters are included on the 2008 Section 303(d) List based upon modeling results associated with TMDL development. TMDL modeling of the baseline condition for all such waters indicates that pollutant reductions from existing sources are needed to ensure compliance with water quality criteria. In the majority of cases, water quality monitoring and predictive modeling reach consistent conclusions regarding the impairment status of waterbodies. In other cases, monitoring data may not be available, may not have been obtained at critical conditions or locations, or may not reflect the conditions that would exist if point sources were discharging at their permit limits. Where predictive modeling indicated that discharges in accordance with existing permit limits would cause violation of water quality criteria, the designated use of the water quality may be classified as "threatened," thereby subjecting it to Section 303(d) listing and TMDL development pursuant to Section 130.7(b)(5).

3. **Section 130.7(b)(5)(iii), Waters for which water quality problems have been reported by local, state, or Federal agencies; members of the public; or academic institutions**.

West Virginia solicited data from entities outside of the WVDEP. Several waters were placed on West Virginia's 2008 Section 303(d) List as a result of data collected by agencies other than WVDEP as identified in Table 4 of the Integrated Report.

- Federal agencies (i.e., U.S. Geological Survey, National Park Service, and EPA)
- State agencies (i.e., WV Department of Natural Resources, WV Department of Agriculture, and ORSANCO)
- Members of the public (i.e., Friends of Decker Creek, Friends of Cheat)
- Private companies (i.e., Alliance Coal, LLC, Orchard Coal)
- Academic institutions (i.e., WVU Water Research Institute)

West Virginia encouraged comment on its draft lists, and the submission of water quality data, each time the list was public noticed. West Virginia received additional data and information as comments to their Public Notice Draft 2008 Section 303(d) List. In their listing rationale, West Virginia summarized the comments and any changes that were made to the proposed list based on additional data and information.

4. **Section 130.7(b)(5)(iv), Waters identified by West Virginia as impaired or threatened in a nonpoint assessment submitted to EPA under Section 319 of the CWA or in any updates of the assessment.**

West Virginia properly listed waters with nonpoint sources causing or expected to cause impairment, consistent with Section 303(d) and EPA guidance. Section 303(d) Lists are to include all WQLSs still needing TMDLs, regardless of whether the source of impairment is a point and/

or nonpoint source. EPA's long-standing interpretation is that Section 303(d) applies to waters impacted by point and/or nonpoint sources. In Pronsolino v. Marcus, the District Court for the Northern District of California held that Section 303(d) of the CWA authorizes EPA to identify and establish TMDLs for waters impaired by nonpoint sources. Pronsolino et al. V. Marcus et al., 91 F.Supp.2d 1337, 1347 (N.D.Ca. 2000), aff'd, 291 F.3d 1123 (9th Cir. 2002), petition for cert. filed, 71 U.S.L.W. 3531 (Feb. 6, 2003) (No. 02-1186). Also, see EPA's 1991 Guidance and National Clarifying Guidance for 1998 Section 303(d) Lists, Aug. 27, 1997.

5. Other data and information used to identify waters (besides items 1-4 discussed above).

EPA has reviewed West Virginia's description of the data, information, and methodology used by West Virginia in the development of their 2008 Section 303(d) List. This includes supplemental data and information that was submitted in response to EPA's comments. Table 4 of the Integrated Report lists 30 sources of data utilized during the listing process. After this review, EPA has concluded that West Virginia has properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 CFR §130.7(b)(5).

C. A rationale for any decision to not use any existing and readily available data and information for any one of the categories of waters as described in Sections 130.7(b)(5) and 130.7(b)(6)(iii).

West Virginia provided its rationale for not relying on particular existing and readily available water quality related data and information as a basis for listing waters. West Virginia DWWM staff evaluated data from internal and external sources to ensure that collection and analytical methods, quality assurance/quality control and method detection levels were consistent with approved procedures. All qualified data from available sources were used in the decision making process. EPA finds West Virginia's screening protocol and criteria described in its 2008 Integrated Report rationale narrative to be a reasonable rationale in determining the usage of outside data, as waters listed as "impaired" should be based on scientifically valid data.

D. Rationale for delisting of waterbodies from the previous Section 303(d) List.

West Virginia has indicated, through "Supplemental Table A", those waterbodies that were included in previous §303(d) Lists but are now delisted from the 2008 Section 303(d) List. West Virginia has demonstrated to EPA's satisfaction its rationale for these delistings. According to the regulations at 40 CFR §130.7(b), a water may be delisted for the following reasons: more recent or accurate data; more sophisticated water quality modeling; flaws in the original analysis that led to the water being listed in the categories in Section 130.7(b)(5); or changes in conditions (i.e., new control equipment, elimination of discharges).

WVDEP delisted waterbodies due to new water quality analyses demonstrating compliance with water quality standards, revisions to water quality criteria associated with the previous listing, or a modification of the listing methodology. One of the conditions outlined includes more recent or accurate data showing compliance with applicable water quality standards. For the 2008 Section 303(d) List, West Virginia submitted various sets of data demonstrating that certain waters either recovered to the point that the applicable water quality standards have been attained, or were listed in error and are currently not impaired. For other delistings, reassessments revealed that some waters were still impaired, but that the pollutants or impairment lengths had changed. These delisted water pollutant combinations were reassessed using methodologies at least as stringent as the methodology that originally placed the water on the list.

For each segment proposed for removal from the 2008 Section 303(d) List, West Virginia provided EPA with sufficient documentation as justification. Such data included benthic macroinvertebrate data, chemical data, compliance data, and other forms of documentation. EPA reviewed this data and approves the delisting determinations listed in "Supplemental Table A." Decisions regarding the need for TMDL development were made in accordance with the requirements of 40 CFR §130.7(b)(1) and the state's listing criteria.

WVDEP has also identified on "Supplemental Table B" those waterbodies where a TMDL has been completed. Consequently, these waterbodies are not included on the Section 303(d) List.

E. Any other reasonable information requested by the Regional Administrator described in Section 130.7(b)(6)(iv).

During the review of West Virginia's 2008 Section 303(d) List, EPA, Region III, staff requested additional information from West Virginia.

- Justification for differences between EPA recommendations and WVDEP's final 2008 Section 303(d) List. In comment letters dated August 1, 2008, and various electronic comments sent from November 2008 to December 1, 2008, EPA requested clarification and amendments to West Virginia's 2008 Section 303(d) List. West Virginia evaluated EPA's comments and provided explanations. Where appropriate, the list was revised to resolve the discrepancy.

- Justification for delisting segments. West Virginia delisted a number of segments listed on the 2008 list which were provided on "Supplemental Table A – Previously Listed Waters – No TMDL Developed." Where waters were delisted, the delisting was consistent with the CWA and implementing regulations.

- Clarification of changes to previously listed waters. EPA requested that West Virginia clarify changes in segment length and stream codes to previously listed waters. This information was provided to EPA to justify changes made from previous listing cycles.

EPA concludes that West Virginia has addressed all additional information EPA requested of the state during the review of the 2008 Section 303(d) List.

F. Identification of the pollutants causing or expected to cause a violation of the applicable water quality standards described in Section 130.7(b)(4).

West Virginia identified the pollutants that were causing or expected to cause a violation of the applicable water quality standards for every listed segment where the identity of the pollutant was known. West Virginia included those pollutants for which a numeric water quality criterion was violated, such as fecal coliform. For violations of a narrative criterion, pollutants were rarely identified. Therefore, many waters were listed for violations of the narrative biological standard without identifying a cause since no cause was determined at the time of listing. West Virginia anticipates that the cause of biological impairments will be determined during TMDL development.

G. Priority Ranking and Targeting.

Within the 2008 Section 303(d) List, West Virginia has provided TMDL development dates and a detailed discussion of both the priority ranking and schedule development in its 2008 Section 303(d) List rationale. This discussion includes a description of West Virginia's five-year Watershed Management Framework cycle for its five hydrologic groups (A-E). EPA reviewed West Virginia's priority ranking of listed waters for TMDL development, and concludes that West Virginia properly took into account the severity of pollution and the uses to be made of such waters. Scheduling, however, takes into account additional relevant factors, such as programmatic considerations (i.e., efficient allocation of resources, Watershed Management Framework cycles, and coordination with other programs or states) and technical considerations (i.e., data availability, problem complexity, availability of technical tools). Another factor West Virginia considered in prioritizing its listed waters is the schedule in the Consent Decree resolving Ohio Valley Environmental Coalition, Inc., et al. v. Carol Browner, et al., No. 2:95-0529 (S.D.W.VA.) entered on July 9, 1997, which establishes dates for EPA to ensure TMDL development for all waters and pollutants listed on West Virginia's 1996 Section 303(d) List.

In addition, EPA reviewed West Virginia's identification of WQLSs targeted for TMDL development in the next three years, and concludes that the targeted waters are appropriate for TMDL development in this timeframe. High priority has been placed on these stream segments. For other impairments where the timing of TMDL development is less certain, multiple year entries were indicated that represent the opportunity for TMDL development per the Watershed Management Framework cycle.

Although West Virginia's projected TMDL development dates do not strictly follow EPA's pace guidance of completion within eight to thirteen years since initial listing, West Virginia's TMDL development plans appear consistent with the guidance in that West Virginia plans to develop TMDLs for approximately 100 impaired waters per year and attempts to simultaneously develop TMDLs for all known impairments. The 2008 Section 303(d) List identifies 20 lakes and 913 stream segments. Given West Virginia's TMDL development rate of approximately 100 waters per year, it is likely that West Virginia will comply with EPA's pace guidance.

H. Coordination with the U.S. Fish and Wildlife Service

During West Virginia's public comment period, EPA sent a copy of West Virginia's Draft 2008 Section 303(d) List in electronic correspondence on March 25, 2008, to the U.S. Fish and Wildlife Service (USFWS). EPA requested comments from USFWS regarding the draft list; no comments were received.

December 5, 2008

Larry Merrill
Office of Watersheds
US EPA Region 3 (3WP30)
1650 Arch Street
Philadelphia, PA 19103-2029

Re: West Virginia 2008 Integrated Report

Dear Mr. Merrill:

Following review of comments provided by your staff, WVDEP made various revisions to the 2008 Integrated Report originally submitted to EPA on October 17, 2008, in anticipation of EPA approval Section 303(d) components.

WVDEP made the following final revisions:

- Supplemental Table B was revised to reflect that approved Fe, Al and pH TMDLs are in place for Dow Fork (WVKC-47-G-1).
- Dissolved aluminum and pH TMDLs were deleted from Supplemental Table B for Long Branch (WVKC-47-G).
- On the 303(d) list, the impaired length of Maynard Branch (WVO-2-Q-23) was revised from “mouth to RM 0.4” to “mouth to RM 0.2”, and the impaired length of Right Fork Cub Branch (WVO-2-Q-31-A) was revised from “entire length” to “mouth to RM 0.6”. The revisions are based upon documentation of the existence of instream impoundments and culverts that we present at the time of biological assessment that limit the representative reach associated with the biological samples collected at or near the mouth of those streams.

Enclosed with this correspondence is a CD containing the revised West Virginia 2008 Integrated Water Quality Monitoring and Assessment Report and supporting documentation. This CD is a complete replacement for the one included with our original submission.

WVDEP remains willing to cooperate in any manner necessary to support EPA’s approval of the Section 303(d) List. If you or your staff have any questions or would like to discuss any issue in greater detail, please contact Dave Montali or me at (304) 926-0499.

Sincerely,

Patrick V. Campbell
Assistant Director

Attachments
cc: Scott Mandirola, Acting Director, DEP-DWWM
William Richardson, US EPA
James Laine, DEP-DWWM

October 17, 2008

Larry Merrill
Office of Watersheds
US EPA Region 3 (3WP30)
1650 Arch Street
Philadelphia, PA 19103-2029

Re: West Virginia 2008 Integrated Report

Dear Mr. Merrill:

Pursuant to requirements contained in the federal Clean Water Act, 40CFR130 and in current federal guidelines, I am hereby transmitting West Virginia's 2008 Integrated Water Quality Monitoring and Assessment Report. The report represents a lengthy review of all existing and readily available water quality information on West Virginia's waters, contains information on our assessment methodologies and includes the West Virginia 2008 Section 303(d) List. The Section 303(d) List component is being officially submitted for your approval.

In support of the submission, the following information is provided on the included CD:

- An electronic copy of the document
- Spreadsheets containing information on stream segments in each of the five assessment categories
- West Virginia's 303(d) decision database with supporting electronic data files
- A spreadsheet identifying and rationalizing all of the changes made to the Section 303(d) List and supplements in the time since the documents were released for public comment. This spreadsheet includes revisions initiated by DEP as well as those resulting from EPA comments and public comments.
- A spreadsheet addressing EPA's questions relative to specific stream listings on the Section 303(d) List and Supplements.

Also enclosed are CDs that contain all files needed to port required information into ADB. Two copies are provided to facilitate transfer of the information to RTI.

The Integrated Report contains a Responsiveness Summary addressing public comments received in response to the Draft Section 303(d) List. Hard copies of all public comments are being sent separately.
Consideration was given to the comments provided by EPA Region III. DEP reactions to those comments are provided below.

EPA requested clarification of the statement: "Further, waters are not deemed impaired based upon "not-detected" analytical results from methodologies that have detection limits that are not sensitive enough to confirm criteria compliance."

For certain water quality criteria, the criterion value is lower than the detection level of approved analytical procedures. The statement remains a component of our listing methodology to indicate that the agency would not use the detection limit of the method as an observed, non-attaining, result if the reported value from an appropriate method is “not detected”.

EPA asked if any data submitted by external sources was screened out and not used to make listing/impairment decisions.

Certain biological information was submitted during the public comment period that could not be effectively validated and was not directly used in the development of the 303(d) list. That notwithstanding, the submitted information did not absolutely contradict DEP biological data and the agency has committed to work with the provider to improve future data quality and documentation, and to conduct joint biological evaluations. Additional details are provided in the Responsiveness Summary.

EPA requested explanation of any instances where streams were not listed based upon clustered monitoring around a single pollution event or where single pollution events were found not to be representative of current conditions.

The statement “WVDEP does not interpret impacts of single pollution events as representative of current conditions if it is known the problems have abated and does not interpret clustered monitoring of a single event as representative of water quality conditions for longer time periods” is a component of our listing methodology to advise stakeholders of agency philosophy. No specific applications of this provision were made in the 2008 process.

EPA requested correction of the consent decree deadline for TMDLs for mine drainage impaired waters.

The TMDL Development section of the Integrated Report contains the correct consent decree deadline of September 30, 2009.

EPA’s questions relative to specific stream listings are addressed in the spreadsheet “WV_2008_IR_Responses_to_EPA_listing_comments_20081007.xls ”. Column H of the spreadsheet identifies the changes made to the draft 303(d) list or supplement, and/or provides the requested explanation.

The document represents the best efforts of our staff and I am confident that you will find the report to be both informative and compliant with applicable guidance. The report as submitted to your office will be posted on our website, although we do not intend to print and distribute the document until we obtain your approval of the Section 303(d) portion. As such, I look forward to your timely review and stand ready to explain our actions in any detail necessary for your approval. If you or your staff have any questions or would like to discuss any issue in greater detail please contact Dave Montali or me at (304) 926-0499 (exts.1063, 1046).

Sincerely,

Patrick V. Campbell
Assistant Director

Attachments

cc: Scott Mandirola, Acting Director, DEP-DWWM
Jennifer Sincock, US EPA
James Laine, DEP-DWWM

List Format Description

The format of the 2008 Section 303(d) list is organized around the Watershed Management Framework. The five hydrologic groups (A-E) of the framework provide the skeleton. Within each hydrologic group, watersheds are arranged alphabetically and impaired waters are sorted by stream code in their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criterion, the affected designated use, the general cause of the impairment (where known), the impaired length (or, by default, the entire length), the planned or last possible timing of TMDL development and whether or not the impairment was on the 2006 list. The cause of impairment is often unknown or uncertain at the time of listing and is so indicated on the list. The scheduling of TMDL development is discussed in detail in Section 6. A West Virginia Watershed Management Framework map is provided to assist navigation within the list. A key is also provided to aid in the interpretation of presented information.

List Supplements Overview

Seven supplements are provided that contain additional information. The seven supplements are entitled: "Previously Listed Waters – No TMDL Developed," "Previously Listed Waters – TMDL Developed," "Impaired Waters under TMDL Development," "Water Quality Improvements Being Implemented – Below Listing Criteria," "Impaired Waters – No TMDL Needed," "Total Aluminum TMDLs Developed" and "New Listings for 2008."

Supplemental Table A - Previously Listed Waters – No TMDL Developed

Previously listed waters from the 2006 list that are not on the 2008 list are included in this supplement if a TMDL has not been developed, and these waters have been reevaluated and determined not to be impaired. Causes for revision of the impairment status include recent water quality data demonstrating an improved water quality condition, revision to the water quality criteria associated with the previous listing, documentation that the water was previously listed in error or a modification of the listing methodology.

Supplemental Table B - Previously Listed Waters - TMDL Developed

TMDLs have been developed for many previously listed waters. TMDL development allows the removal of an impaired water from the 303(d) list. In the suggested format of the Integrated Report, such waters are to be classified in Category 4A and clearly distinguished from Category 5 and the 303(d) list. Waters included in Category 4A have TMDLs developed, but water quality improvements are not yet complete and/or documented. The waters identified in Supplement B will match those of Category 4A of the Integrated Report.

Supplemental Table B-1 – Impaired Waters under TMDL Development

TMDLs for certain impaired waters in the New River watershed have been developed by the DEP and are awaiting EPA approval. It is assumed that the EPA will approve these TMDLs prior to their approval of the 2008 Section 303(d) list. Barring unforeseen complications, the waters/impairments shown in Table B-1 will also be included in Category 4A of the Integrated Report.

Supplemental Table C - Water Quality Improvements

The goal of TMDLs and stream restoration projects is to bring the stream back to the point where it meets its designated uses and the associated water quality criteria. Supplement C includes a listing of streams with improved water quality due to TMDL implementation or pre-TMDL stream restoration work resulting in delisting. In the Integrated Report, the waters in Supplement C are to be included in Category 1 (meeting all uses), provided that impairments for other uses/pollutants are not evidenced.

Supplemental Table D - Impaired Waters - No TMDL Development Needed

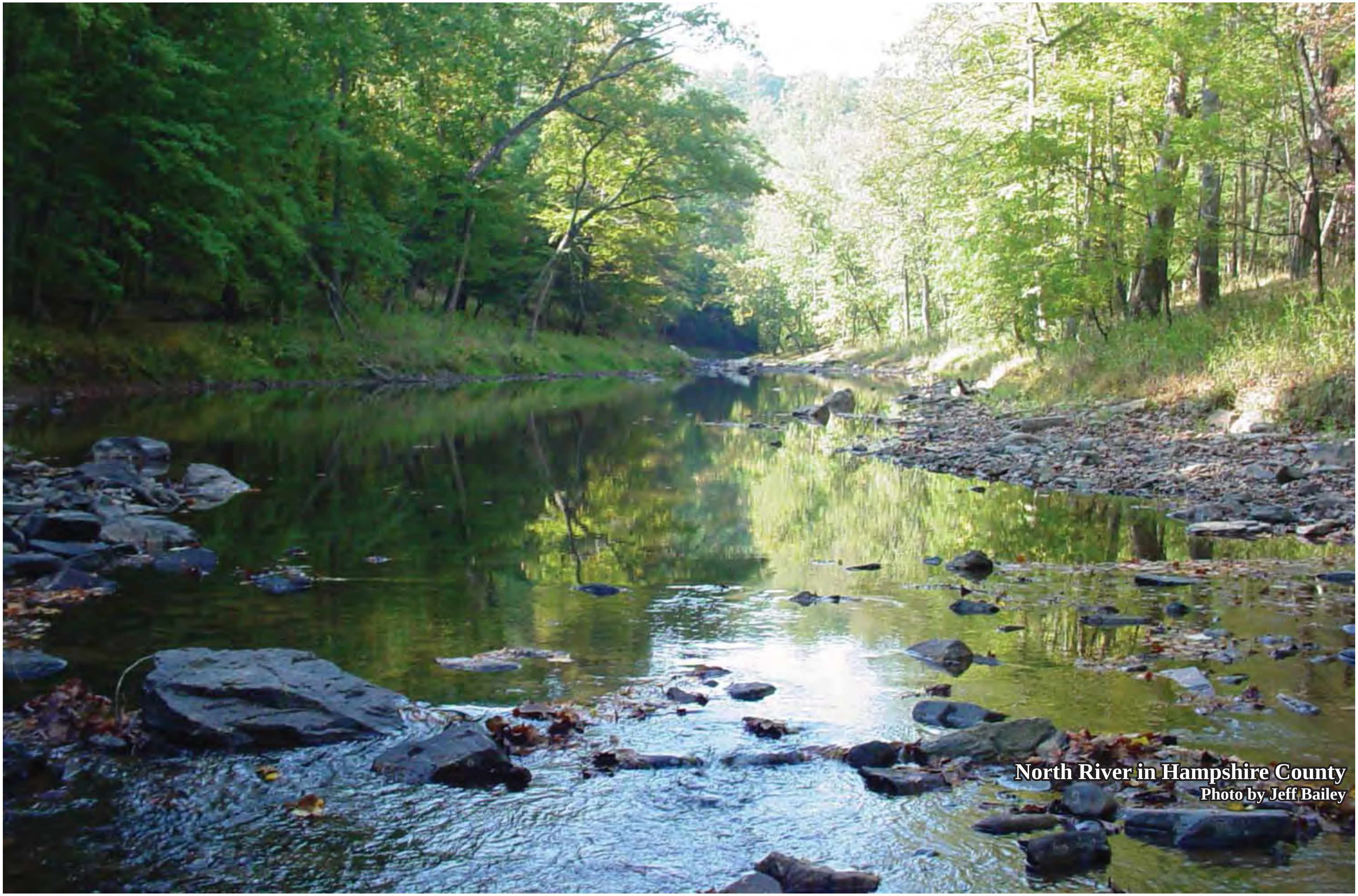
This table lists impaired waters for which either other control mechanisms are in place to control pollutants or the water is not impaired by a pollutant (i.e., flow alterations caused by mining). These are the same waters contained in the Integrated Report's Category 4b and 4c, respectively.

Supplemental Table E - Total Aluminum TMDLs Developed

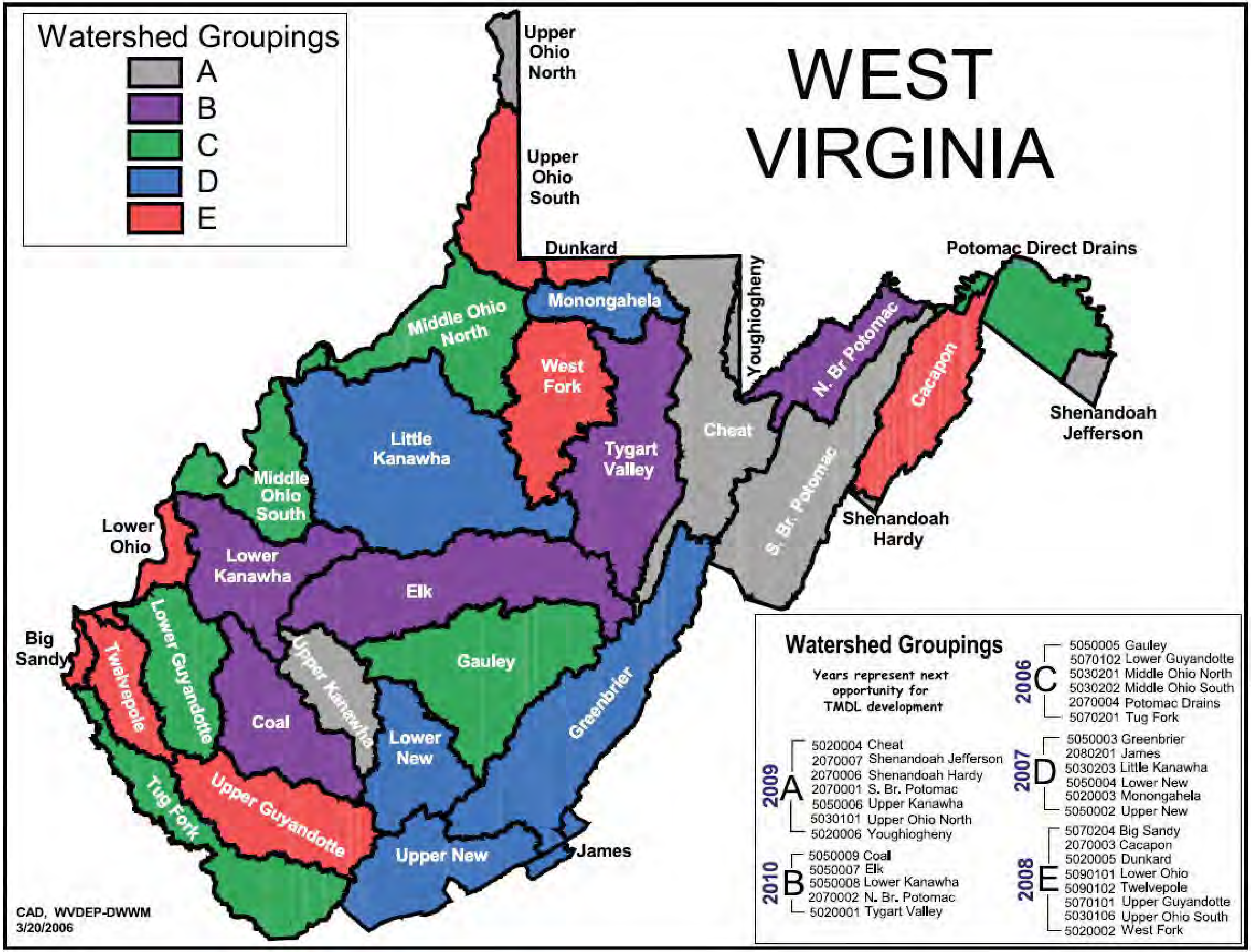
This table contains a list of previously listed waters for total aluminum TMDL that were developed and established by the EPA. Due to a criteria change from total aluminum to dissolved aluminum, West Virginia placed total aluminum TMDLs onto a separate table from Supplemental Table B.

Supplemental Table F – New Listings for 2008

This table is a list of impaired waters that were not previously included on the 2006 Section 303(d) list.



North River in Hampshire County
Photo by Jeff Bailey



Watershed Groupings
A
B
C
D
E
WEST VIRGINIA
Upper Ohio North
Upper Ohio South
Dunkard
Monongahela
Middle Ohio North
West Fork
Youghiogheny
N. Br. Potomac
Cacapon
Potomac Direct Drains
Shenandoah Jefferson
Little Kanawha
Tygart Valley
Cheat
S. Br. Potomac
Shenandoah Hardy
Middle Ohio South
Lower Ohio
Lower Kanawha
Elk
Big Sandy
Twelvepole
Lower Guyandotte
Upper Kanawha
Gauley
Greenbrier
Coal
Lower New
Tug Fork
Upper Guyandotte
Upper New
James
CAD, WVDEP-DWWM
3/20/2006
Watershed Groupings
Years represent next opportunity for TMDL development
2009 A
5020004 Cheat
2070007 Shenandoah Jefferson
2070006 Shenandoah Hardy
2070001 S. Br. Potomac
5050006 Upper Kanawha
5030101 Upper Ohio North
5020006 Youghiogheny
2010 B
5050009 Coal
5050007 Elk
5050008 Lower Kanawha
2070002 N. Br. Potomac
5020001 Tygart Valley
2006 C
5050005 Gauley
5070102 Lower Guyandotte
5030201 Middle Ohio North
5030202 Middle Ohio South
2070004 Potomac Drains
5070201 Tug Fork
2007 D
5050003 Greenbrier
2080201 James
5030203 Little Kanawha
5050004 Lower New
5020003 Monongahela
5050002 Upper New
2008 E
5070204 Big Sandy
2070003 Cacapon
5020005 Dunkard
5090101 Lower Ohio
5090102 Twelvepole
5070101 Upper Guyandotte
5030106 Upper Ohio South
5020002 West Fork

west virginia department of environmental protection

2010 West Virginia Integrated Water Quality Monitoring and Assessment Report

dep

west virginia department of environmental protection
Division of Water and Waste Management

WEST VIRGINIA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2010

Prepared to fulfill the requirements of Sections 303(d) and 305(b) of the federal Clean Water Act and Chapter 22, Article 11, Section 28 of the West Virginia Water Pollution Control Act for the period of July 2007 through June 2009.

Joe Manchin III
Governor

Randy C. Huffman
Cabinet Secretary
Department of Environmental Protection

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Introduction

The federal Clean Water Act contains several sections requiring reporting on the quality of a state's waters. Section 305(b) requires a comprehensive biennial report and Section 303(d) requires, from time to time, a list of waters for which effluent limitations or other controls are not sufficient to meet water quality standards (impaired waters). West Virginia code Chapter 22, Article 11, Section 28 also requires a biennial report of the quality of the state's waters.

This document is intended to fulfill West Virginia's requirements for listing impaired waters under Section 303(d) of the Clean Water Act and the Water Quality Planning and Management Regulations, 40CFR130.7. In addition to the list of impaired waters, it explains the data evaluated in the preparation of the list and methodology used to identify impaired waterbodies. Information is provided that allows the tracking of previously listed waters that are not contained on the 2010 list. The EPA has recommended these requirements be accomplished in a single report that combines the comprehensive Section 305(b) report on water quality and the Section 303(d) list of waters that are not meeting water quality standards. The suggested format of this "Integrated Report" includes provisions for states to place their waters in one of the five categories described in Table 1.

Table 1 - Integrated Report categories

Category 1	fully supporting all designated uses	
Category 2	fully supporting some designated uses, but no or insufficient information exists to assess the other designated uses	
Category 3	insufficient or no information exists to determine if any of the uses are being met	
Category 4	waters that are impaired or threatened but do not need a Total Maximum Daily Load	
	Category 4a	waters that already have an approved TMDL but are still not meeting standards
	Category 4b	waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses
	Category 4c	waters that have been determined to be impaired, but not by a pollutant
Category 5	waters that have been assessed as impaired and are expected to need a TMDL	

This Integrated Report is a combination of the 2010 Section 303(d) List and the 2010 Section 305(b) report. In general, this report includes data collected and analyzed between July 1, 2004 and June 30, 2009, from the state's 32 major watersheds by the West Virginia Department of Environmental Protection's (DEP's) Watershed Assessment Branch and other federal, state, private and nonprofit organizations. Waters that are included on the 2010 Section 303(d) List are placed in Category 5 of this report.

Water Quality Standards

Water quality standards are the backbone of the 303(d) and 305(b) processes of the federal Clean Water Act. Instream data are compared with water quality standards to determine the use attainment status of streams and lakes. In West Virginia, the water quality standards are codified as 47CSR2 – Legislative Rules of the Department of Environmental Protection – Requirements Governing Water Quality Standards. Impairment assessments conducted for the 2010 cycle are based upon water quality standards that have received the EPA's approval and are currently considered effective for Clean Water Act purposes. In that regard, the EPA has recently approved several changes to the West Virginia Water Quality Standards. Information regarding the approved changes can be found on the DEP's Web page at http://www.dep.wv.gov/WWE/Programs/wqs/Documents/EPA%20 Letters/2009_09_16_07_57_00.pdf

A waterbody is considered impaired if it violates water quality standards and does not meet its designated uses. Use attainment is determined by the comparison of the instream values of various water

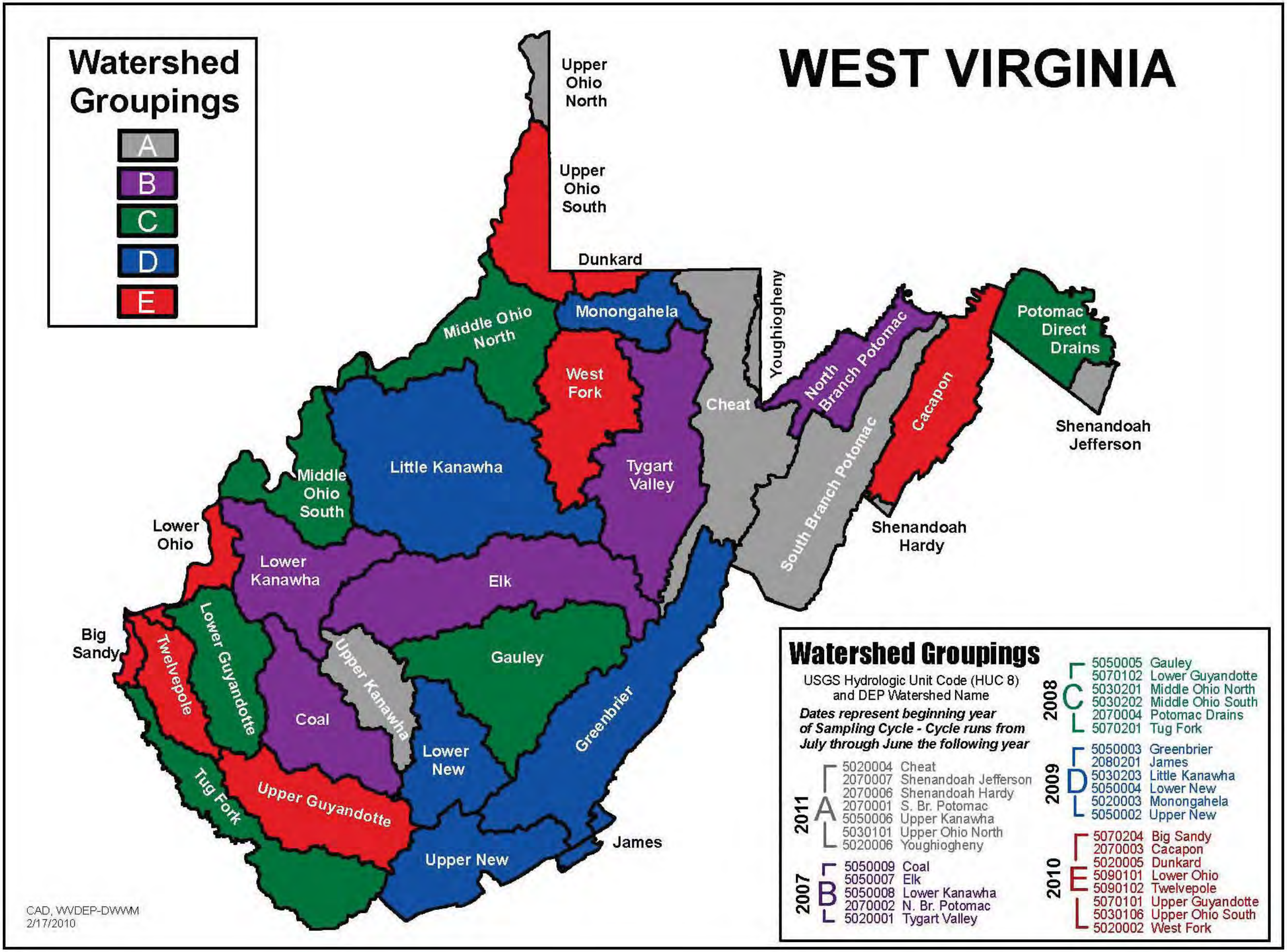
quality parameters to the numeric or narrative criteria specified for the designated use (see the Assessment Methodology section for more information on use attainment determination). Waterbodies that are impaired by a pollutant are placed on the 303(d) List and scheduled for TMDL development.

Some examples of designated uses are water contact recreation, propagation and maintenance of fish and other aquatic life, and public water supply. Designated uses are described in detail in Section 6.2 of 47CSR2 and are summarized in Table 2. Each of the designated uses has associated criteria that describe specific conditions that must be met to ensure that the water can support that use. For example, the "propagation and maintenance of fish and other aquatic life" use requires that the pH remain within the range of 6.0 to 9.0 standard units at all times. This is an example of a numeric criterion. Numeric criteria are provided in Appendix E of the water quality standards.

Numeric criteria consist of a concentration value, exposure duration and an allowable exceedance frequency. The water quality standards prescribe numeric criteria for the "propagation of fish and other aquatic life" use in two forms: acute criteria that are designed to prevent lethality, and chronic criteria that prevent retardation of growth and reproduction. The numeric criteria for acute aquatic life protection are specified as one-hour average concentrations that are not to be exceeded more than once in a three-year period. The criteria for chronic aquatic life protection are specified as four-day average concentrations that are not to be exceeded more than once in a three-year period. The exposure time criterion for human health protection is unspecified, but there are no allowable exceedances.

Table 2 - West Virginia designated uses

Category	Use Subcategory	Use Category	Description
A	Public Water	Human Health	waters, which, after conventional treatment, are used for human consumption
B1	Warm Water Fishery	Aquatic Life	propagation and maintenance of fish and other aquatic life in streams or stream segments that contain populations composed of all warm water aquatic life
B2	Trout Waters	Aquatic Life	propagation and maintenance of fish and other aquatic life in streams or stream segments that sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations
B4	Wetlands	Aquatic Life	propagation and maintenance of fish and other aquatic life in wetlands. Wetlands generally include swamps, marshes, bogs and similar areas
C	Water Contact Recreation	Human Health	swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats
D1	Irrigation	All Other	all stream segments used for irrigation
D2	Livestock Watering	All Other	all stream segments used for livestock watering
D3	Wildlife	All Other	all stream segments and wetlands used by wildlife
E1	Water Transport	All Other	all stream segments modified for water transport and having permanently maintained navigation aides
E2	Cooling Water	All Other	all stream segments having one or more users for industrial cooling
E3	Power Production	All Other	all stream segments extending from a point 500 feet upstream from the intake to a point one-half mile below the wastewater discharge point
E4	Industrial	All Other	all stream segments with one or more industrial users. It does not include water for cooling


WEST VIRGINIA
Watershed Groupings
A
B
C
D
E
Upper Ohio North
Upper Ohio South
Dunkard
Monongahela
Youghiogheny
Middle Ohio North
West Fork
Cheat
North Branch Potomac
Cacapon
Potomac Direct Drains
Shenandoah Jefferson
Little Kanawha
Middle Ohio South
Tygart Valley
South Branch Potomac
Shenandoah Hardy
Lower Ohio
Lower Kanawha
Elk
Big Sandy
Twelvepole
Lower Guyandotte
Upper Kanawha
Gauley
Coal
Greenbrier
Lower New
Tug Fork
Upper Guyandotte
James
Upper New
CAD, WVDEP-DWWM
2/17/2010
Watershed Groupings
USGS Hydrologic Unit Code (HUC 8) and DEP Watershed Name
Dates represent beginning year of Sampling Cycle - Cycle runs from July through June the following year
2011 A
5020004 Cheat
2070007 Shenandoah Jefferson
2070006 Shenandoah Hardy
2070001 S. Br. Potomac
5050006 Upper Kanawha
5030101 Upper Ohio North
5020006 Youghiogheny
2007 B
5050009 Coal
5050007 Elk
5050008 Lower Kanawha
2070002 N. Br. Potomac
5020001 Tygart Valley
2008 C
5050005 Gauley
5070102 Lower Guyandotte
5030201 Middle Ohio North
5030202 Middle Ohio South
2070004 Potomac Drains
5070201 Tug Fork
2009 D
5050003 Greenbrier
2080201 James
5030203 Little Kanawha
5050004 Lower New
5020003 Monongahela
5050002 Upper New
2010 E
5070204 Big Sandy
2070003 Cacapon
5020005 Dunkard
5090101 Lower Ohio
5090102 Twelvepole
5070101 Upper Guyandotte
5030106 Upper Ohio South
5020002 West Fork

Water quality criteria also can be written in a narrative form. For example, the water quality standards contain a provision that states that wastes, present in any waters of the state, shall not adversely alter the integrity of the waters or cause significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. Narrative criteria are contained in Section 3 of 47CSR2. More information regarding the use of narrative criteria is contained in the Use Assessment Procedures section.

Ohio River criteria

For the Ohio River, both the Ohio River Valley Water Sanitation Commission (ORSANCO) and West Virginia water quality criteria were considered, as agreed upon in the ORSANCO compact. Where both ORSANCO and West Virginia standards contain a criterion for a particular parameter, instream values were compared against the more stringent criterion. The DEP supports ORSANCO's efforts to promote consistent decisions by the various jurisdictions with authority to develop 305(b) reports and 303(d) lists for the Ohio River. In support of those efforts, West Virginia has and will continue to work with ORSANCO and the other member states through a workgroup charged with improving consistency of 305(b) reporting among compact states. ORSANCO standards may be reviewed at http://www.orsanco.org/index.php/standards.

Surface Water Monitoring and Assessment

This section describes West Virginia's strategy to monitor and assess the surface waters of the state. The DEP's Division of Water and Waste Management (DWWM) collects most of the state's water quality data. The Watershed Assessment Branch of DWWM is responsible for general water quality monitoring and watershed assessment. The remainder of this section describes the monitoring and assessment activities conducted by the Watershed Assessment Branch.

Streams and Rivers

West Virginia has a comprehensive strategy for monitoring the flowing waters of the state, by far the most prevalent surface waterbody type in the state. The Watershed Assessment Branch utilizes a tiered approach, collecting data from long-term monitoring stations, targeted sites within watersheds on a rotating basin schedule, randomly selected sites, and sites chosen to further define impaired stream segments in support of TMDL development. The following paragraphs present these approaches in further detail.

Probabilistic (random) sampling

Probabilistic sampling began in 1997. This program utilizes sites that are selected randomly by the EPA's Western Ecology Division Laboratory in Corvallis, Ore. The data collected at these sites can be subjected to statistical analysis to provide an overall characterization of a watershed. This analysis can then be used to predict the probability of a condition occurring within a watershed. The initial probabilistic sampling cycle, which concluded in 2001, was conducted in accordance with the five-year Watershed Management Framework cycle. Thirty sites were sampled within each watershed. A second round of probabilistic sampling, initiated in 2002, modified the framework cycle to a statewide approach. The objective for the second round was to collect 30 samples from each watershed over a five-year period (six sites are collected from each watershed annually). Importantly, at the end of the five-year cycle, each of the state's major watersheds will continue to be independently characterizable. The data analyzed for this report covers sampling years 2005 through 2009 and provides an overview of major pollutants impacting state waters.

This departure from the framework cycle minimizes the effects of extreme conditions, such as periodic droughts and flooding and allows for annual updates of statewide stream conditions. Data collection protocols are similar to those applied to watershed assessment sampling including collection of benthic macroinvertebrate for biological community analysis. However, probabilistic sampling includes more rigorous water quality and habitat analysis.

Ambient water quality monitoring network

The ambient water quality monitoring network concept was established

in the early 1960s. The network currently consists of 26 fixed stations that, starting in 2006, are sampled bi-monthly. Sampling stations are located at the mouths of the state's larger rivers and additional sites are situated to isolate the impacts from major industrial complexes and other potential sources of impairment. The data provides information for trend analyses, general water quality assessments and pollutant loading calculations, and allows water resources managers to quickly gauge the health of the state's major waterways.

Targeted sampling

Targeted sampling has been a component of West Virginia's assessment toolbox since the Watershed Assessment Program's inception in late 1995. Streams are sampled according to a five-year rotating basin approach. Sites are selected from the watersheds targeted for each particular year. Each site is subjected to a one-time evaluation of riparian and instream habitat, basic water quality parameters, and benthic macroinvertebrate communities.

Sites are selected to meet a variety of informational needs in the following areas:

- Impaired streams
- Reference (minimally impacted) streams
- Spatial trends (multiple sites on streams exceeding 15 miles in length)
- Areas of concern as identified by the public and stakeholders
- Previously unassessed streams

Pre-TMDL development sampling

The major objective of this effort is to collect sufficient data for Total Maximum Daily Load modelers to develop stream restoration plans. Pre-TMDL sampling follows the framework cycle, i.e., impaired streams from watersheds in hydrologic group A will be sampled in the same year as the targeted sampling.

The 303(d) List is the basis for initial site selection and additional sites are added to comprehensively assess tributary waters and to allow identification of the suspected sources of impairment. Benthic

Figure 1 – West Virginia's ambient monitoring sites

1. Shenandoah River at Harpers Ferry	14. Kanawha River at Winfield
2. Opequon Creek east of Bedington	15. Guyandotte River at Huntington
3. Cacapon River near Great Cacapon	16. Twelvepole Creek south of Ceredo
4. South Branch of the Potomac River	17. Tug Fork at Fort Gay
5. Cheat River at Albright, W.Va.	18. Guyandotte River at Pecks Mill
6. Cheat River below Cheat Lake	19. Coal River at Tornado
7. Monongahela River in Star City	20. Elk River at Coonskin Park
8. Dundard Creek east of Pentress	21. Kanawha River at Chelyan
9. Tygart Valley River at Colfax	22. Gauley River at Beech Glen
10. West Fork River at Enterprise	23. New River above Gauley Bridge
11. Middle Island Creek at Arvilla	24. Greenbrier River at Hinton
12. Hughes River west of Freeport	25. New River at Hinton
13. Little Kanawha River at Elizabeth	26. New River at Virginia state line

macroinvertebrate sampling is conducted in 303(d) listed streams having aquatic life impairments. Assessment of water quality impaired streams is more intensive and consists of monthly sampling for parameters of concern. This method captures data under a variety of weather conditions and flow regimes. Pre-TMDL sampling also includes an effort to locate the specific sources of impairment, with particular attention to identifying non-point source land use stressors as well as any permitted facilities that may not be meeting their permit requirements. For more information, see the TMDL Development Process section.

Lakes and Reservoirs

West Virginia does not make a distinction between lakes and reservoirs. By state definition, a publicly owned lake is any lake, reservoir, or pond that meets the definition of "waters of the state," is owned by a government agency or public utility, and is managed as a recreational resource for the general public. The DEP conducted lake water quality assessments from 1989 through 1996. This program was funded by the federal Clean Lakes Program, which was phased out in 1995. With additional financial support being provided to enhance state's monitoring strategies, DEP added a lake monitoring component in 2006. This program focuses on water quality, collecting field parameters (dissolved oxygen, pH, temperature, and conductivity), nutrient data, clarity, and Chlorophyll A. Multiple sites per lake are sampled and profile data for temperature and dissolved oxygen are obtained.

Many of West Virginia's largest reservoirs are controlled by the U.S. Army Corps of Engineers. Although the Corps' primary mission is to manage structures to provide navigation and flood control, the agency also is committed to water quality management. Data generated by the Corps has been used for assessment purposes.

Additional lake information is available from the West Virginia Division of Natural Resources. The DNR, one of the signatory agencies in the Partnership for Statewide Watershed Management, conducts fish community surveys on many of the state's reservoirs.

Biological Indicators

Benthic macroinvertebrates are collected from riffle substrate in wadeable streams and identified to genus level. This assemblage of aquatic life organisms provides a direct means of assessing the aquatic life use support and can be collected and identified cost effectively. It has the advantage over one-time water quality samples in that the benthic community is affected by and provides indications of past water quality conditions. The DEP currently uses the West Virginia Stream Condition Index, a family-level multimetric index developed specifically for use in West Virginia. This is the primary means of assessing attainment of the aquatic life use.

Wetlands

The State of West Virginia takes great interest in the management of its wetlands both large and small. The current total wetland area within the state is 102,000 acres which comprises less than 1 percent of the State's total acreage {wetland acreage determined by National Wetlands Inventory: WV 1980-86}. As of this report, instituted management efforts are currently geared toward protection of wetlands by regulatory proceedings or acquisition. Permitting authority for activities impacting wetlands (Section 404) lies with the U. S. Army Corps of Engineers. West Virginia insures protection through an active Section 401 certification program.

Since the submission of the last 305(b) report; changes in the status of West Virginia's wetlands monitoring are being pursued. These changes are intended to be the start of a larger statewide monitoring and assessment program. Watershed Assessment personnel have been researching/developing assessment and monitoring strategies in conjunction with the EPA and other states. The Wildlife Resources Section of the Division of Natural Resources, in cooperation with West Virginia University, is also currently evaluating aerial photography from 2003 at a 1:4800 scale to supplement the data from the National Wetlands Inventory. Information from this project will provide improved detail and information, because the original 1986 NWI's imagery was at a 1:48,000 scale. The updated wetland polygons will show any creations, natural changes, human modifications, or loss since the 1986 NWI as well as proper Cowardin classification. A set completion date is not available, but currently six counties have been QA/QC'd by the DNR personnel and the DNR plans to finish most of the state during 2010.

The West Virginia Division of Natural Resources and the DEP plan to begin a wetlands monitoring and assessment program prior to the 2011 National Assessment. Due to the specialized skills of the the DNR, the responsibilities of a majority of field work will fall with the DNR. The DEP will combine efforts and personnel where applicable in the field as well as remain the primary reporting entity for the state. The DNR has recently completed a rapid assessment method for wetlands which can be used statewide. Calibration with intensive assessments and GIS remote assessments on the same wetlands/sites gives us high confidence in data to be generated in future rapid assessments. The DNR plans to start collecting data for database use/storage in the field season of 2010.

A National Wetlands Condition Assessment (EPA) is planned for 2011 which will encompass the entire United States. The DEP continues to maintain contact with the EPA in preparation for this NWCA; and the DEP and DNR plan to combine efforts to assess the sites in West Virginia. The EPA intends to inform states of site selections by March 2010 and follow with standardized assessment methods by April 2010.

Table 3 - Current and future monitoring activities
26 Ambient sites will be monitored monthly (Monongahela River Basin sites) or bi-monthly from July 2009 through June 2011
A third round of probabilistic monitoring that began in the spring of 2007 will continue through 2011. Seventy-eight site are assessed each year. Fish Community assessements are being conducted at approximately one-third of the sites.
Pre-TMDL development monitoring for Group D - 181 sites from 118 streams in the Monongahela River Watershed were sampled from July 2009 through June 2010.
Pre-TMDL development monitoring for Group E - 301 sites from 224 streams in the West Fork River Watershed will be sampled from July 2010 through June 2011.
Group D Targeted Sampling – 53 targeted sites were sampled in 2009. Targeted assessments include water quality, biology, and habitat measures.
Group E Targeted Sampling – Approximately 50 sites will be sampled during the 2010 summer sampling season.
Lakes – Eight lakes within Group E will be sampled four times during the 2010 growing season (May through October) and approximately 10 Group A Lakes will be sampled in 2011.
Water quality meters were deployed at 48 locations on 36 streams. Parameters measured include pH, temperature, conductivity, and dissolved oxygen.
Long Term Monitoring Sites (LTMS or LitMuS). Approximate 50 sites were sampled in 2009. A similar or greater number will be assessed in 2010.

Current wetland information can be found in the booklet West Virginia's Wetlands… Uncommon, Valuable Wildlands (Tiner, 1996). Future valuable information on the number and condition of West Virginia's wetlands will be available from the EPA, DEP, and DNR.

Citizen monitoring

The fourth stream assessment project is the West Virginia Save Our Streams volunteer monitoring program. Initiated in 1989, this program encourages citizens to become involved in the improvement and protection of the state's streams. The focus is largely on nonpoint source pollution abatement. Save Our Streams has two objectives. First, it provides the state with enhanced ability to monitor and protect its surface waters through increased water quality and benthos data collection. Second, it improves water quality through educational outreach to the state's citizens. After citizens are actively involved in stream monitoring and restoration activities, they can initiate improvement projects within their own watersheds. Training workshops are conducted annually to provide quality assurance. A major improvement in data accessibility for the program has been the development of an online Volunteer Assessment Database. As an example of the functions of the new database, volunteer stream reports are now available online at http://www.dep.wv.gov/WWE/getinvolved/SOS/Pages/WAD.aspx. Volunteer monitors can register on the database and enter their own data online, or continue to submit the information to the coordinator for a quality assurance review. The coordinator also is the database administrator, and has tools to verify the quality of the information before it is approved. The database is available for public viewing without registration. In addition, the program prepares an annual "State of Our Streams" report.

DATA MANAGEMENT

Assessed data

All readily available data was used during the evaluation process. In preparation for the development of this report, the agency sought water quality information from various state and federal agencies, college and universities, private individuals, businesses, organizations and others. News releases and public notices were published in state newspapers. Specific requests for data were made to state and federal agencies known by the DEP to be generators of water quality data. The DEP's staff reviewed data from external sources to ensure that collection and analytical methods, quality assurance and quality control and method detection levels were consistent with approved procedures. In addition, DEP has developed guidance for those wishing to submit data. The document contains a list of requirements for submitted data along with helpful internet links and a checklist for data submitters. The guide can be found on the DEP's Web site using the following link: http://www.dep.wv.gov/WWE/watershed/IR/Documents/WV_WQ_Data_Submission_Guidelines_2010.pdf

Assessment decisions are made using the most accurate and recent data available to the agency. For stream water quality assessments, the DEP generally used water quality data generated between July 2004 and June 2009. The use of data more than five years old is intentionally limited. In the absence of new information, previous assessments are carried forward even if the data becomes older than five years. Additionally, if a water quality criteria change is approved which affects an older assessment, the new assessment will only reflect the current criteria.

Waters are not deemed impaired based upon water quality data collected when stream flow conditions are less than 7Q10 flow (the seven consecutive day average low flow that recurs at a 10 year interval) or within regulatory mixing zones. Further, waters are not deemed impaired based upon "not-detected" analytical results from methodologies that have detection limits that are not sensitive enough to confirm criteria compliance.

External data providers

Data submitted from sources outside of the Watershed Assessment Branch were considered in the development of this report. This also includes data from other the DEP programs. Entities that provided information in response to the agency's request for data for the 2010 Section 303(d) list are shown in Table 4. External data received and qualified in the preparation of previous Section 303(d) lists were reconsidered in the 2010 review. Once data was submitted, the DEP performed the following:

- Determined quality and quantity
- Determined stream codes and mile points
- Formatted data for evaluation
- Used qualified data from external sources to make assessment decisions

Table 4 - Data providers for the 2010 303(d) List and Integrated Report

ARGUS Energy	Chesapeake Bay Program Office	West Virginia Department of Agriculture
Don Gasper	Friends of Deckers Creek	West Virginia Department of Environmental Protection
ORSANCO	State of Kentucky	The Conservation Fund Freshwater Institute
U.S. Army Corps of Engineers	USDA Forest Service	U.S. Geological Survey
West Virginia Water Research Institute	Mud River Watershed Decentralized Wastewater Demonstration Project	

USE ASSESSMENT PROCEDURES

The primary focus of this report is to assess water quality information and determine if the designated uses of state waters are impaired. This section describes the various protocols used to determine use impairment.

303(d) Listing Methodology

Numeric water quality criteria

The decision methodology for numeric water quality criteria used in preparation of the draft 2010 Section 303(d) list are consistent with those used in 2008 listing cycle.

Typically, if an ample data set exists and exceedances of chronic aquatic life protection and/or human health protection criteria occur more than 10 percent of the time, the water is considered to be impaired. If the rate of exceedance demonstrated is less than or equal to 10 percent, then the water is considered to be meeting the designated use under evaluation. Ample data sets are defined as sets with 20 or more distinct observations. If fewer than 20 samples per station or representative area exist and three or more values exceed a criterion value, then the water also is considered to be impaired. For this scenario (three observed violations), if additional non-exceeding monitoring results were available that would increase the data set size to 20 observations, a greater than 10 percent exceedance frequency would still exist.

Under West Virginia Water Quality Standards, acute aquatic life protection criteria have associated exposure durations of one hour and may be exceeded once every three years. The normal practice of "grab-sampling" ambient waters is generally consistent with the one-hour exposure duration specified in the standards. Therefore, a direct application of the allowable exceedance frequency provided in the standards is made when assessing impairment relative to acute aquatic life protection criteria. If two or more exceedances of acute criteria are observed in any three-year period, the water is considered to be impaired.

If the data being evaluated is generated as part of a comprehensive network being monitored for a specific purpose, the data may be assigned a higher level of assessment quality, and the "10-percent rule" may be applied with confidence to data sets containing less than 20 observations per station. The primary example of an intensified monitoring program that generates higher assessment quality data is that which is conducted by the DEP to support TMDL development. The pre-TMDL monitoring format includes flow measurement and monthly water quality monitoring for one year at multiple locations throughout a watershed. Information is generated over a range of stream flow conditions and in all seasons. Habitat assessment and biological monitoring is performed in conjunction with water quality monitoring. The information generated under this format is among the most comprehensive available for assessing water quality. Upon conclusion of monitoring, it is then necessary for agency personnel to make a definitive judgment relative to impairment. In most instances, application of the "10-percent rule" to the pre-TMDL monitoring data sets result in the classification of waters as impaired if two or more exceedances of a criterion are demonstrated.

Additionally, the DEP does not interpret the impacts of a single pollution event as representative of current conditions if it is believed that the problem has been addressed. Similarly, the DEP does not intend to interpret the results of clustered monitoring of a single event as being representative of water quality conditions for longer time periods. Datasets are screened for excessive clustering of monitoring, in space or time, to avoid misinterpretation.

Table 5 summarizes the criteria used to make 303(d) impairment decisions relative to numeric water quality criteria period.

Segmentation of streams

The majority of newly listed streams were identified as impaired for their entire length. Segmentation occurred only in limited situations involving streams with impoundments or alternative designated uses, or when knowledge of a specifc pollutant source allowed clear distinction of impaired and unimpaired segments.

Segmentation based upon the limited amount of water quality monitoring data that is usually available may not accurately portray the extent of

Table 5 - Numeric water quality decision criteria for listing of impaired waters		
Water Quality Criteria	**Impairment Thresholds**	**Additional Considerations**
Acute Aquatic Life Protection (Use Category B)	**The water is impaired if two exceedances of acute aquatic life protection numeric criteria occur within any three-year period.**	**If, in the most recent three-year period, no exceedances of criteria are evidenced and at least 12 monitoring results are available, then the water may not considered "impaired."**
Chronic Aquatic Life Protection (Use Category B) Human Health Protection (Use Categories A and C)	**The water is impaired if a greater than 10% frequency of exceedance is demonstrated in an ample dataset (20 or more available observations). The water is impaired if three exceedances of criteria occur with less than 20 available monitoring results. The water is impaired if a greater than 10% frequency of exceedance is demonstrated with less than 20 available observations, if the data being evaluated is of high assessment quality (> two violations)**	**If, for waters with regularly scheduled monitoring, in the most recent two-year period, no exceedances of criteria are evidenced and at least eight observations are available, then the water is not considered impaired.**

impairment and may contradict the ultimate findings of the TMDL that the listing mandates. The DEP believes the TMDL development process, which links extensive water quality monitoring with pollutant sources through computer modeling, provides the best assessment of criterion attainment and the most accurate identification of the watershed sources for which pollutant reductions are necessary. TMDL modeling predicts water quality over a wide range of climatic and stream flow conditions, incorporates the specific exposure duration and exceedance frequency terms of water quality criteria and prescribes pollutants allocations that will result in attainment of criteria in all stream segments.

Evaluation of fecal coliform numeric criteria

Fecal coliform assessments were based on the previously described decision criteria for numeric water quality criteria. Given the complexity of this particular criteria, most assessments are performed by comparing observations to the "maximum daily" criterion value of 400 counts/100ml. Evaluation of the monthly geometric mean fecal coliform criterion (200 counts/100ml) occurs only where five or more individual sample results are available within a calendar month.

Numeric fecal coliform water quality criteria are applicable to the Water Contact Recreation and Public Water Supply designated uses. Section 8.13 of Appendix E of the West Virginia Water Quality Standards states: *Maximum allowable level of fecal coliform content for Primary Contact Recreation shall not exceed 200/100ml as a monthly geometric mean based on not less than five samples per month; nor to exceed 400/100ml in more than 10 percent of all samples taken during the month.*

A practical difficulty exists in accurate assessment of criteria compliance due to the resource commitment that would be necessary to perform monitoring at a sufficient frequency to make determinations using the geometric mean criteria, since the monthly geometric mean criterion is conditioned upon the availability of at least five distinct sample results in a month. The "maximum daily" criterion is not conditioned by a minimum sample set requirement, but practical use of the apparent 10 percent exceedance allowance would involve at least 10 samples per month.

The most frequent and regular fecal coliform water quality monitoring conducted by the Watershed Assessment Section is once per month. That monitoring frequency precludes assessment of the monthly geometric mean criterion and hampers accurate assessment of the maximum

daily criterion. Due to limited resources, more frequent fecal coliform monitoring could only be accomplished by significantly reducing the number of West Virginia streams and/or stations where water quality assessments are performed. The DEP does not consider that to be a reasonable alternative.

The DEP uses the following protocols when making assessments relative to fecal coliform numeric criteria:

- *No assessments are based upon the monthly geometric mean criterion (200 counts/100ml) unless an available data set includes monitoring at five per month or greater frequency. When data sets are available, the listing decision criteria for numeric water quality criteria are applied, considering each monthly geometric mean as an available monitoring result.*
- *The listing decision criteria are applied to the maximum daily criterion (400 counts/100ml) and available individual monitoring results, but without the monthly prejudice. For example, if twice per month monitoring is conducted for a year and two results in two separate months are greater than 400, the stream would be assessed as fully supporting (2/24 – 8.3 percent rate of exceedance) rather than basing assessments on two monts out of 12 in noncompliance (2/12 – 16.7 percent rate of exceedance). If five samples per month monitoring is conducted for one year and four daily results greater than 400 are measured in four different months, the stream would be assessed as fully supporting (4/60 – 6.7 percent rate of exceedance) rather than nonsupporting (4/12 – 33.3 percent rate of exceedance), provided that the monthly geometric means were below the 200 counts/100 ml criteria.*

The decision criteria does not provide for 303(d) listing of waters with severely limited data sets and exceedance (i.e., one sample in a five-year period > 400 counts/100ml). Such waters would be classified as having insufficient data available for use assessment. The DEP will target these "fecal one-hit" waters for additional monitoring by incorporating them into the pre-TMDL monitoring plans at the next opportunity for TMDL development in their watershed. Where the intensified pre-TMDL monitoring (monthly sampling for one year) indicates impairment, TMDL development will be immediately initiated, even though the water may not be included in Category 5 of the current Integrated Report.

Narrative water quality criteria – biological impairment data

The narrative water quality criterion of 47CSR2 – 3.2.i. prohibits the presence of wastes in state waters that cause or contribute to significant adverse impact to the chemical, physical, hydrologic and biological components of aquatic ecosystems. Streams are listed as biologically impaired based on a survey of their benthic macroinvertebrate community. Benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams of West Virginia. The West Virginia Stream Condition Index (WVSCI) is composed of six metrics that were selected to maximize discrimination between streams with known impairments and reference streams. Streams with WVSCI scores of less than 60.6 are considered biologically impaired and included on the 303(d) List. Benthic macroinvertebrates are collected with a 500 mm mesh rectangular dip net. The kick sample is collected from the 1.0 m^2 area of substrate. Identifications are completed for a 200-organism subsample. The WVSCI was developed

West Virginia Stream Condition Index or WVSCI

The WVSCI consists of six benthic community metrics combined into a single multimetric index. The WVSCI was developed by Tetra Tech Inc. (2000) using DEP and EPA data collected from riffle habitats in wadeable streams.

In general terms, all metric values were converted to a standard 0 (worst) to 100 (best) point scale. The six standardized metric scores were then averaged for each benthic sample site to come up with a final index score ranging from 0.0 to 100.0. Using the distribution of scores from all sites that are considered reference sites, an impairment threshold of 68.0 was established. If a stream site received a WVSCI score greater than 68.0, it was considered to be unimpaired.

WVSCI Scoring Criteria
$>$ 68.0 Unimpaired
$\geq$ 60.6 to 68 "Gray Zone"
$<$ 60.6 Impaired

To address the potential variability associated with a number of factors (collector, micro-habitat, subsampling, etc.) a precision estimate was determined by analysis of duplicate biomonitoring data. The precision estimate (7.4 WVSCI points) was subtracted from the impairment threshold to define a "gray zone" of WVSCI scores between 60.6 and 68.0 for which adverse impact to biological integrity is less than certain.

The effective use of limited TMDL development and implementation resources requires the avoidance of impairment misclassifications. Although the true WVSCI impairment threshold is 68.0, DEP identified biological impairment in the 303(d) listing process only in response to WVSCI scores less than 60.6, so as to allow the highest degree of confidence in the validity of the listed biological impairments.

from data using these methods. Streams are listed as being biologically impaired only if the data was comparable (e.g., collected utilizing the same methods used to develop the WVSCI, adequate flow in riffle/run habitat, and within the current index period).

Most streams with low biological scores are listed as having an unknown source/cause of impairment on the 303(d) List and most are listed, by default, for their entire length. It is doubtful that the entire length of every stream is impaired, but without further data, the exact length of impairment is unknown. Each listed stream will be revisited prior to TMDL development. The additional assessments performed in the pre-TMDL monitoring effort will better define the impaired length. The causative stressor(s) of the impairment and the contributing sources of pollution also will be identified during the TMDL development process. If the stressor identification process demonstrates that the biological impairment is not caused by a pollutant, then no TMDL will be developed.

Narrative water quality criteria – fish consumption advisories

The narrative water quality criterion of 47CSR2 – 3.2.e prohibits the presence of materials in concentrations that are harmful, hazardous or toxic to man, animal or aquatic life in state waters. Fish consumption advisories are used to inform the public about potential health risks associated with eating fish from West Virginia's streams. The DEP, the Division of Natural Resources, and the Bureau for Public Health have collaborated on fish contamination issues since the 1980s; however, an executive order by the governor in 2000 mandated a formal collaborative process to issue fish consumption advisories. Fish consumption advisories are developed and issued in accordance with an interagency agreement. In the absence of specific body-burden criteria, the presence of contaminants in fish tissue in amounts equivalent to a two meal per month advisory is considered sufficient evidence of impairment.

Risk-based principles are used to determine whether fish consumption advisories are necessary. These advisories are used as a public education tool to help citizens make informed decisions about eating fish caught in state streams. The risk-based approach estimates the probability of adverse health effects and provides a statement on the health risk facing the angler and high-risk groups including women of childbearing age and children. West Virginia's fish consumption advisories include guidelines on the number of meals to eat and information on proper fish preparation to further minimize risk.

Waterbody-specific fish consumption advisories exist for 16 state streams and six lakes for a variety of fish species and contaminants. Additionally, there is a general statewide advisory that recommends limiting the consumption of certain sport-caught fish from all West Virginia waters in relation to low-level mercury and/or polychlorinated biphenyl (PCB) contamination. The statewide advisory provides species-specific recommendations ranging from one meal per week to one meal per month. The fish advisories Web site is www.wvdhhr.org/fish/current.asp.

The listing of waters based on fish consumption advisories is strongly supported by the EPA. For PCBs, waters are considered impaired if at least one monitoring result for tissue from a commonly consumed species exceeds the two meal per month advisory trigger. In regard to mercury, West Virginia water quality standards contain a numeric body-burden criterion for methylmercury in fish tissue. The criterion for protection of public water supply and water contact recreation designated uses is 0.5 µg/g. In the Ohio River, the applicable ORSANCO body-burden criterion is 0.3 µg/g. Fish tissue mercury impairment decisions are based upon a direct comparison of available observations to the applicable body-burden criteria.

Narrative Water Quality criteria - Greenbrier River algae

In recent years, the DEP has received a number of reports of excessive algal growth along certain sections of the Greenbrier River which has made fishing and swimming in the areas nearly impossible during portions of the summer season. In order to address this loss of recreational use, the DEP began evaluating algal growth on the Greenbrier River in 2007 to determine both the extent of impact and the sources of pollution which were contributing to these conditions.

The initial investigation documented conditions in the mainstem of

the Greenbrier River. Thick algal mats and/or large areas of attached filamentous algae growth occurred over approximately 50 miles of the river, at times stretching from bank to bank. Similar conditions occurred in 2008. During both 2007 and 2008, public water suppliers drawing river water from affected areas received complaints of odor in their drinking water requiring initiation of additional treatment measures.

In 2009, DEP personnel performed intensive water quality sampling along the Greenbrier River as the algae began to bloom. Instream grab samples were analyzed for total and dissolved phosphorus, total nitrogen, alkalinity, hardness, and other parameters. Both the chemical and physical conditions in the Greenbrier River – including hardness, alkalinity, temperature, clarity, and substrate – proved to be ideal for growth of filamentous algae. The water chemistry results also revealed elevated levels of nitrogen and dissolved phosphorus in areas of excessive algae growth, with phosphorus being the limiting nutrient. The written report *Assessment of Filamentous Algae in the Greenbrier River and Other West Virginia Streams* summarizing the investigation is available on the DEP's Web site, www.dep.wv.gov/WWE/watershed/wqmonitoring/documents/Greenbrier/Algae_Summary_WQS_meeting_May_09.pdf.

Currently West Virginia does not have numeric water quality criteria for phosphorus in flowing rivers. However, seasonal non-attainment of designated uses (public water supply and contact recreation) has been documented due to excessive algal growth and the excessive algae growth has been attributed to anthropogenic phosphorous inputs. Non-attainment of uses is based on multiple provisions of Title 47-2-3.2 of the West Virginia Legislative Rules ("Conditions Not Allowable in State Waters"). Section 3.2.a prohibits distinctly visible floating and suspended solids (filamentous algae mats) which pervade large reaches of the Greenbrier River. Section 3.2.h prohibits conditions that require treatment beyond conventional treatment to produce finished drinking water and Section 3.2.i prohibits conditions caused by wastes that adversely alter the integrity of a stream, including impacts to the physical, chemical and biological components of an aquatic ecosystem. In the case of the Greenbrier River, the DEP has determined the existence of the prohibited conditions and causation by a pollutant. The DEP is assessing the Greenbrier River as impaired from its mouth upstream to mile point 102.7.

ASSESSMENT RESULTS

This section contains the results from all the data that has been assessed for West Virginia waterbodies. Table 6 shows a summary of the classification of West Virginia waters under the five "Integrated Report" categories (see page 4). The results reveal that 23 percent of West Virginia's stream miles are in either Category 1 or 2 (fully supporting all or some assessed uses). Category 3, streams with insufficient data, makes up 39% of stream miles, the largest percentage of the five categories. However, that number is somewhat deceiving. The streams with limited data are typically small unnamed tributaries, which usually contribute to the larger waterbodies which have been assessed. All major rivers in the state; the Kanawha, Monongahela and Little Kanawha rivers, have data and have been assessed and placed into one of the other four categories. Approximately one-third of West Virginia's streams are impaired and fall into either Category 4 or 5.

Category 1, Category 2, and Category 3 waters are quite large, therefore, they are not published in this document. The three categories can be viewed on DEP's Web site, www.dep.wv.gov. Waters listed in category 4 are included in the supplements toward the back of this document in Supplemental B, B1, and D sections. Category 5 waters are included in the document and is the 303(d) List.

Category 5 includes 1091 impaired stream segments, covering approximately 6,685 stream miles that are impaired and need TMDLs developed. This number has increased from 6,157 miles of impaired streams identified on the 2008 list. The increase is due, in part, to the TMDL development timeline. TMDLs always are in various stages of development, and with the additional sampling data generated, streams and stream segments may move from Catergories 1, 2 or 3 to Category 5.

Table 6 - 2010 Category Summary Report for West Virginia					
LAKES					
Type	**CATEGORY**	**# of lakes**	**% lakes**	**acres**	**% acres**
Lake	**1**	**27**	**20**	**522**	**2**
Lake	**2**	**47**	**36**	**5990**	**26**
Lake	**3**	**43**	**32**	**10029**	**43**
Lake	**4a**	**9**	**7**	**189**	**1**
Lake	**5**	**6**	**4**	**6498**	**28**
	TOTAL	**132**	**100**	**23228**	**100**
STREAMS					
Type	**CATEGORY**	**# of stream segments**	**% stream segments**	**miles of streams**	**% miles**
Stream	**1**	**1269**	**11**	**4378**	**14**
Stream	**2**	**824**	**7**	**2834**	**9**
Stream	**3**	**6776**	**61**	**11711**	**39**
Stream	**4a**	**1180**	**11**	**4883**	**16**
Stream	**4b**	**2**	**0**	**2**	**0**
Stream	**4c**	**36**	**0**	**35**	**0**
Stream	**5**	**1091**	**10**	**6685**	**22**
	TOTAL	**11178**	**100**	**30528**	**100**

Additionally, TMDLs that have not yet been approved by the EPA remain listed in Category 5. Once these TMDLs are approved, those streams and stream segments will move to Category 4a.

Table 7 contains a breakdown of use support specific to the use categories for state waters as set forth in the Water Quality Standards (47CSR2). The most common impairments of West Virginia waters are:

- Biological impairment, as determined through application of the West Virginia Stream Condition Index
- Bacterial contamination evidenced by exceedance of numeric water quality criteria for fecal coliform
- Exceedance of numeric water quality criteria for pollutants associated with mine drainage (low pH, and high concentration of iron, aluminum, and/or manganese)
- PCB fish tissue contamination, and
- Low pH associated with acid rain

The list and the summary results of Tables 8 and 9 provide an overview of the impairment status of West Virginia waters. An alternative mechanism for assessing general status and the relative impacts of various causes and sources is provided by DEP's Probabilistic Monitoring Program. The program and assessment results are described in the Probabilistic Data Summary section.

Table 7 - West Virginia use support summary

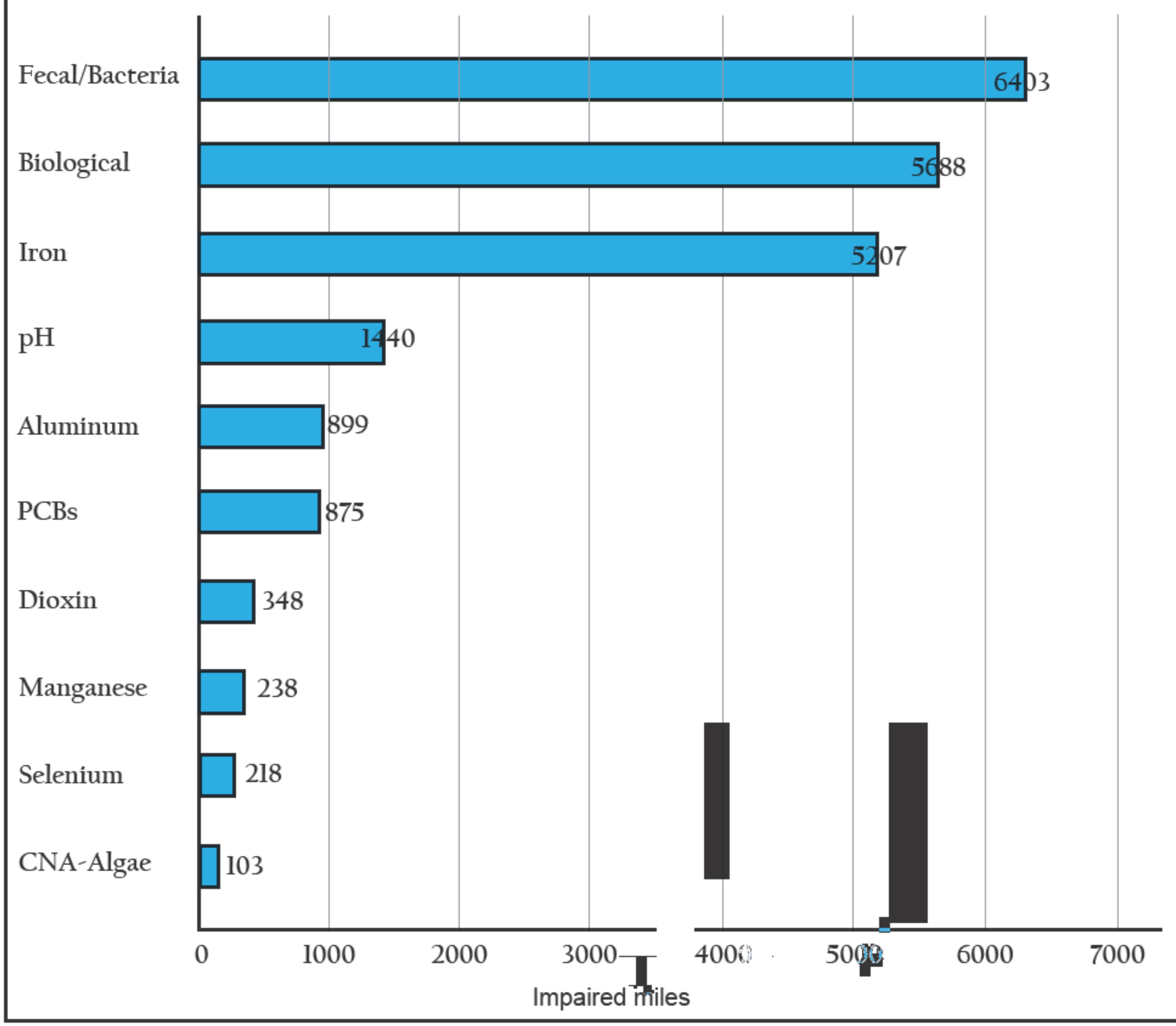
LAKES																		
Designated Use	Number of Lakes	Size (acres)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Acres	%	#	%	Acres	%	#	%	Acres	%	#	%	Acres	%
A - Public Water	132	23228	33	25	852	4	55	42	20772	89	35	26	1415	6	9	7	189	1
B1 - Warm Water Fishery	113	17891	25	22	550	3	44	39	15737	88	35	31	1415	8	9	8	189	1
B2 - Troutwater	19	5337	12	63	999	19	7	37	4338	81	0	29	0	0	0	0	0	0
C - Contact Recreation	132	23228	62	47	3395	15	25	19	11863	51	38	29	1468	6	7	5	6502	28
D - Agriculture and Wildlife	132	23228	70	53	6243	27	23	17	15513	67	38	29	1468	6	1	1	4	0
E -Industrial	132	23228	70	53	6243	27	23	17	15513	67	38	29	1468	6	1	1	4	0
Total	132	23228																

STREAMS																		
Designated Use	Number of Stream Segments	Size (miles)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Miles	%	#	%	Miles	%	#	%	Miles	%	#	%	Miles	%
A - Public Water	11175	30525	2319	21	9120	30	437	4	1060	3	6603	59	11269	37	1816	16	9076	30
B1 - Warm Water Fishery	10146	25473	1166	12	3935	15	992	10	3207	13	6323	62	10637	42	1665	16	7694	30
B2 - Troutwater	1032	5051	347	34	1979	39	228	22	1292	26	278	27	628	12	179	17	1152	23
C - Contact Recreation	11178	30528	2368	21	8616	28	720	7	2641	9	6622	59	11303	37	1468	13	7968	26
D - Agriculture and Wildlife	11177	30527	3694	33	15896	52	343	3	1471	5	6622	59	11303	37	518	5	1858	6
E -Industrial	11178	30528	3694	33	15896	52	343	3	1471	5	6622	59	11303	37	519	5	1858	6
Total	11178	30528																

Table 8 - Summary of the causes for impaired streams

TYPE	CAUSE	SIZE (acres)
Lake	Sedimentation/ Siltation	193
Lake	Trophic State Index	100
Lake	Iron	54
Lake	DO	8
Lake	PCBs	6498
TYPE	CAUSE	SIZE (miles)
Stream	Temperature, water	2.3
Stream	Ammonia	5.4
Stream	Chloride	21.6
Stream	Lead	23.3
Stream	DO	25.2
Stream	Nitrite	30.7
Stream	Low Flow Alterations	44.3
Stream	Manganese	238
Stream	Zinc	17.7
Stream	Selenium	218
Stream	Dioxin	348
Stream	Aluminum	899
Stream	PCBs	875
Stream	pH	1440
Stream	Iron	5207
Stream	Fecal/Bacteria	6403
Stream	Bio-Impairment	5688
Stream	CNA - Algae	103

Table 9 - Number of miles for the leading causes of West Virginia impaired streams
(shows causes with >100 miles impaired)

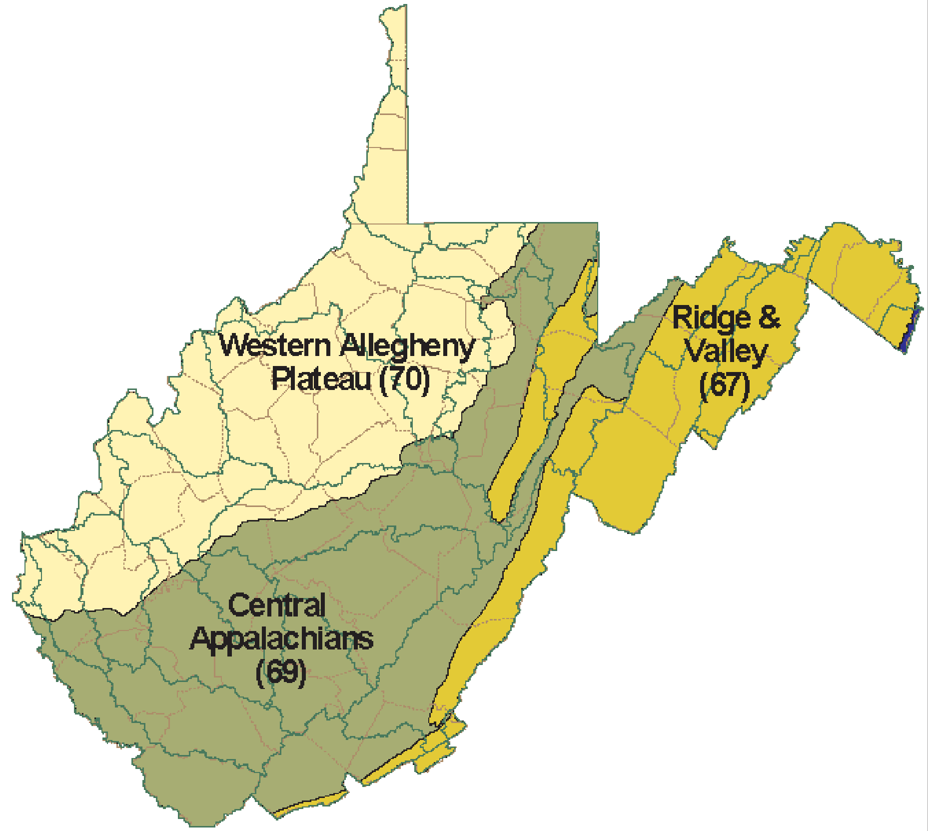


Probabilistic Data Summary

The probabilistic design used for this report was stratified to ensure adequate coverage across all watersheds and allows the state to characterize overall water quality conditions at the watershed (USGS 8-digit HUC) level in addition to providing statewide estimates of condition. The goal of any probabilistic program is to provide statistically unbiased estimates of stream condition throughout a particular region (i.e., watershed, ecoregion or state) without assessing every single stream mile in that region. This approach can be used to describe various aspects of stream conditions including, the proportion of stream miles with biological impairment, the proportion of stream miles with specific water quality criteria violations, and the characterization of the relative importance of stressors such as sedimentation or acid precipitation.

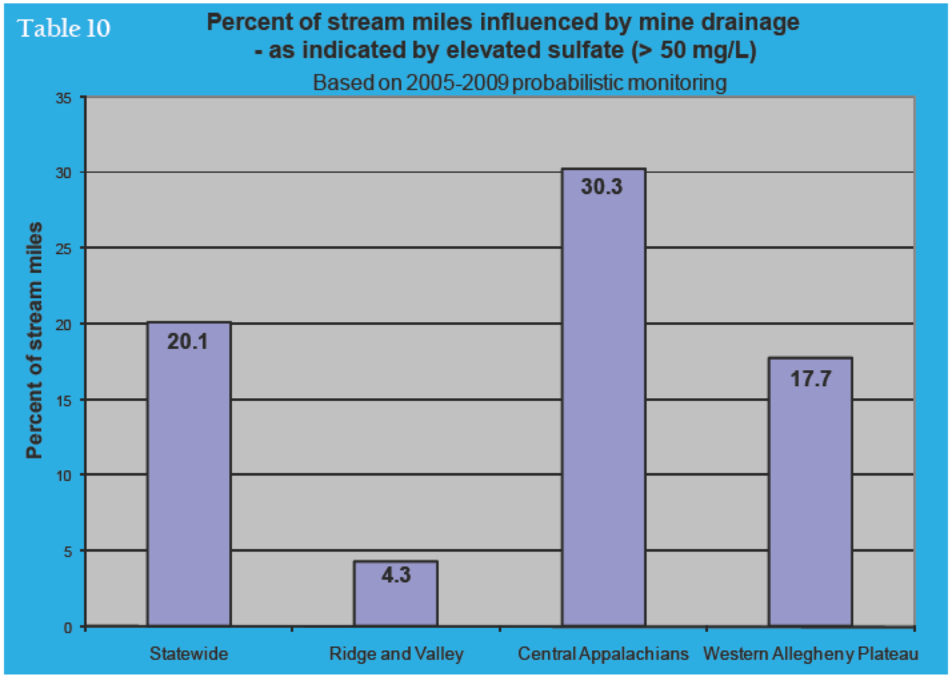
In 2006, West Virginia completed its second 5-year cycle using a sample design that provided data from 750 sites from wadeable streams statewide. The target population for this effort was small to medium sized (1st-4th order) wadeable streams. Ninety-eight percent of West Virginia's stream miles are of this size class and approximately 70% of these are wadeable. This level of effort allows for estimations of conditions across the state with a high degree of confidence. The sites are spread across 25 watersheds and watershed groupings (some small watersheds are combined with adjacent ones) and allow estimates of conditions at this scale, but with lesser confidence. Six sites were sampled in each of the 25 watersheds each year, resulting in 30 samples per watershed at the end of the five-year design. While this design does allow for watershed level characterizations following the completion of the cycle, describing these estimates for the more broad classification of Level 3 Ecoregions reduces the uncertainties around the different estimates of condition. The DEP is currently in its third cycle of monitoring ambient conditions using the Probabilistic Method. This report summarizes the data from the last two years from the previous cycle (2002 – 2006) and the first three years from the third cycle (2007 – 2009) and are described in terms of ecoregions.

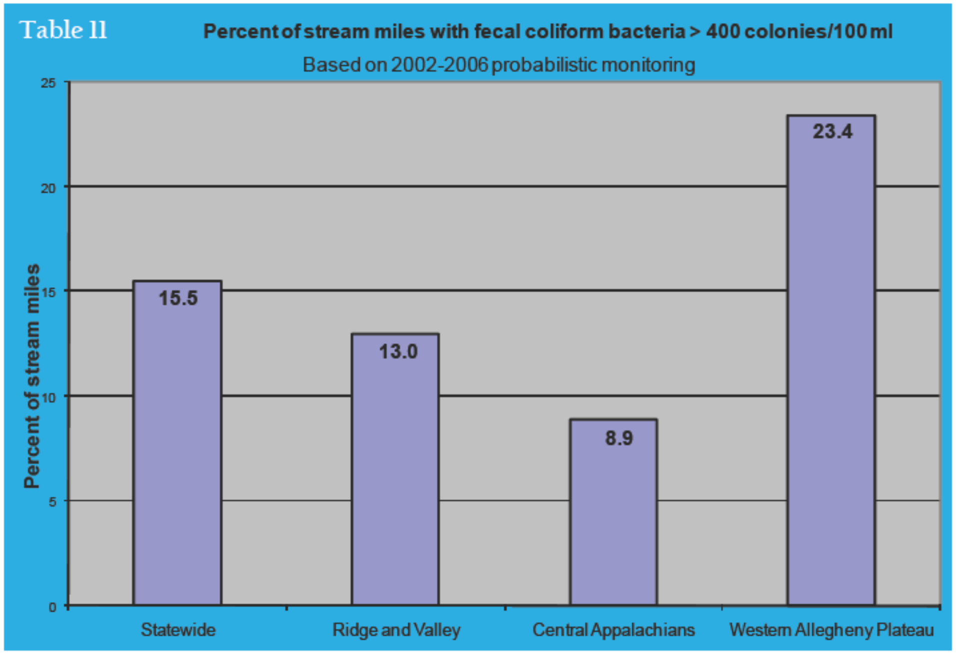
Figure 2– West Virginia's ecoregions map



Mine drainage

Mine drainage streams may be impaired by low pH and/or elevated concentrations of metals, including iron, aluminum, and manganese. Other dissolved ions such as sulfate may also be present in concentrations above ambient levels. A sulfate concentration greater than 50 mg/L was used to identify probabilistic sites influenced by mine drainage. Following this guideline, approximately 20.1% of the stream miles statewide are influenced by mine drainage (Table 10). Observed on an ecoregional basis, mine drainage influences a greater proportion of stream miles in the coal rich Central Appalachians (Ecoregion 69) than in the Ridge and Valley (Ecoregion 67) or Western Allegheny Plateau (Ecoregion 70). About 30.3% of the stream miles in the Central Appalachians are influenced by mine drainage. Contrastingly, about





4.3% and 17.7% of stream miles are influenced by mine drainage in the Ridge and Valley and Western Allegheny Plateau, respectively.

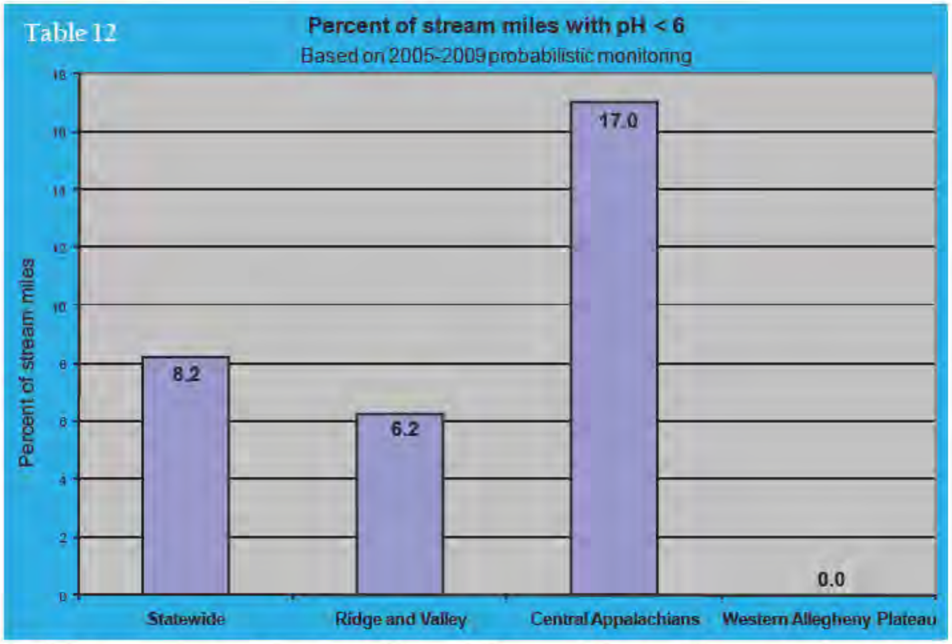
Bacterial contamination

Many West Virginia waters contain elevated levels of fecal coliform bacteria. Contributors to the problem include leaking or overflowing sewage collection systems, illegal homeowner sewage discharges by straight pipes or failing septic systems, and runoff from urban or residential areas and agricultural lands. Based on probabilistic data, about 15.5% of stream miles in the state have fecal coliform bacteria levels that exceed the criterion of 400 colonies/100mL (Table 11). In general, watersheds in the more developed regions of the state had a greater proportion of stream miles exceeding the criterion. The proportion of stream miles violating the criterion was highest in the Western Allegheny Plateau Ecoregion (23.4% of stream miles) and somewhat lower in the Central Appalachians (8.9% of stream miles) and the Ridge and Valley Ecoregions (13.0% of stream miles). It should be noted that the probabilistic monitoring is performed at baseflow conditions. Because samples are not collected during storm runoff events, bacteria levels that would likely increase under these higher flow conditions are not accounted for in this assessment.

Acidity

The aquatic life communities in the headwater sections of many West Virginia waters continue to be impacted by low pH acidic water quality. The impairment is most prevalent in watersheds with soils of low buffering capacity and most often caused by acid precipitation and less often (but more severely) by acid mine drainage. An evaluation of probabilistic data indicates that approximately 8.2% of the stream miles in the state have pH values below 6.0 (Table 12). Most of the stream miles identified as impacted by acidic waters are in the Central Appalachians Ecoregion, representing 17.0% of the stream miles within this area. Specifically, the Forested Hills and Mountains section of this ecoregion are largely susceptible to acid deposition impacts due to infertile soils and resistant sandstones of the Pottsville group. The Ridge and Valley Ecoregion is less susceptible to the impacts of acid deposition with geologic materials such as limestone and shale providing more buffering capacity to neutralize acid precipitation. Nonetheless, probabilistic data indicates that approximately 6.2% of the stream miles

Table 12



in this ecoregion are impacted by acidic conditions. There are almost no stream miles with impacts attributed to acidic conditions in the Western Allegheny Plateau ecoregion. Again, this ecoregion has well buffered soils that limit the impacts of acid precipitation and acid mine drainage.

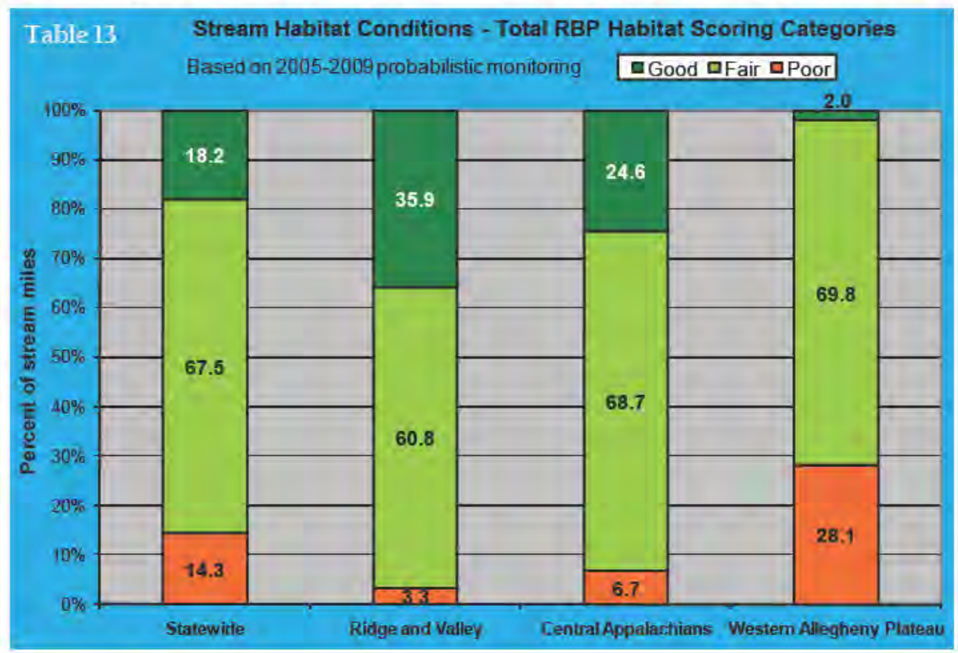
Habitat quality

It is nearly impossible to accurately interpret the biological health of streams without measuring various aspects of habitat quality. During the course of probabilistic sampling, DEP personnel collected data on many features of both riparian and instream habitat known to be important to the biological communities of streams. Habitat parameters from the EPA's Rapid Bioassessment Protocol (RBP) were measured. These include measures of the amount of sediment and embeddedness in the stream channel as well as measures of the vegetation along the bank and riparian zone in the stream corridor. Specifically, ten characteristics are scored (0-20) based on their quality and then combined to assess the overall physical habitat condition of the site. The overall scores (Total RBP Habitat) were categorized as good, fair, or poor (Table 13). Based on probabilistic data, about 18.2% of stream miles have good habitat quality (total RBP score of 160 or greater), 67.5% of stream miles have fair habitat quality (110–159), and 14.3% of stream miles have poor habitat quality (< 110). While these categorical thresholds are somewhat arbitrary, they do provide a good comparison of one area to another.

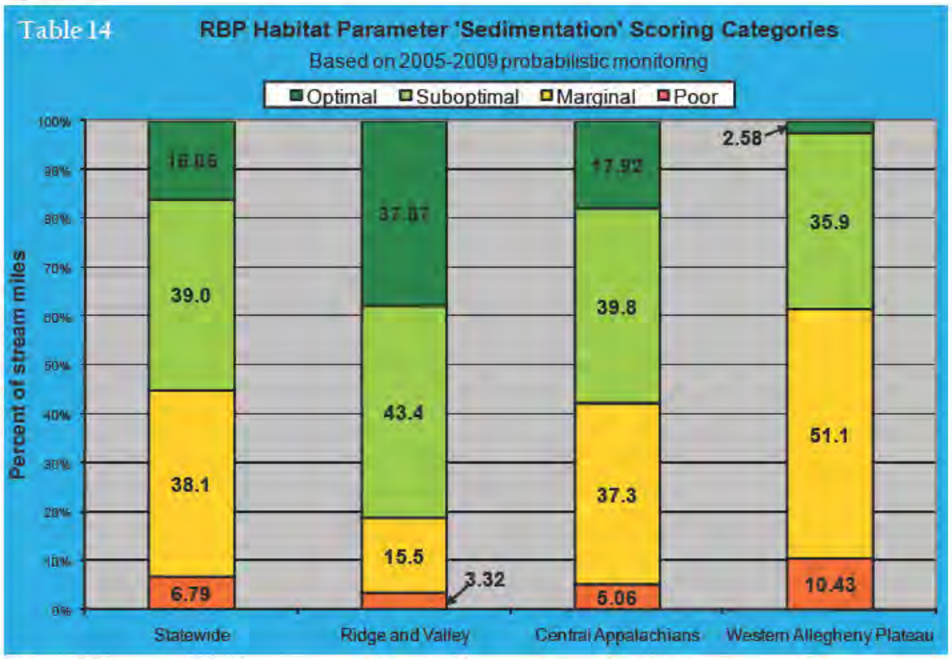
The Ridge and Valley and Central Appalachians Ecoregions are similar with respect to overall habitat quality. Over 24% of stream miles in each of these ecoregions are of good quality and less than 7% are poor with respect to overall habitat quality. In comparison, habitat quality scores are lower in the Western Allegheny Plateau. The presence of more widespread development and factors such as higher rates of soil erosion in this ecoregion are potential causes for only 2% of its stream miles being rated as good in overall habitat quality. Additionally, the proportion of stream miles with poor habitat quality (28.1%) is substantially higher in this ecoregion. It is important to consider that the greatest proportion (over 97%) of stream miles in the state are in the fair or lower habitat categories. This indicates that most of the state's stream miles have at least some degree of habitat perturbation degradation.

Although the DEP may gain insight into overall habitat conditions by combining the individual measures, it is useful to examine specific

Table 13



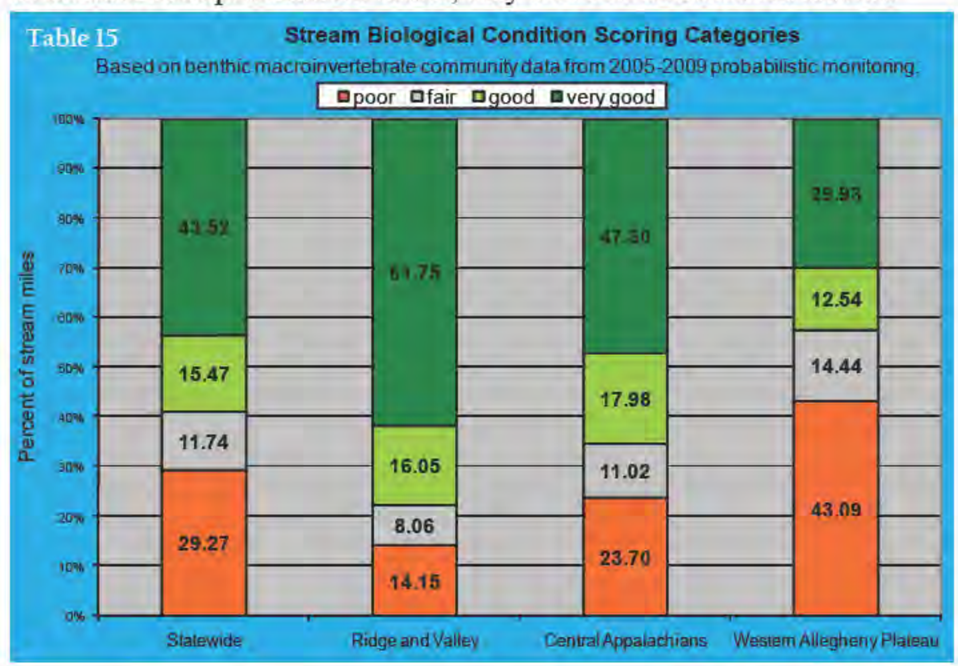
habitat characteristics. Sedimentation is one of the most significant problems facing West Virginia streams. Significant sources of increased sedimentation include agricultural activities, mining, logging, oil and gas, roads, urban and suburban development, and removal of stream bank and riparian vegetation. The effects of sediment deposition on stream biota are well known and include interference with respiration and the smothering of physical habitat and organism eggs. The categories used to rate the individual habitat characteristics are labeled as optimal, suboptimal, marginal, and poor (which match the field assessment forms). Sedimentation results for the state as a whole indicate that 6.79% of stream miles are in poor condition, 38.1% stream miles are marginal, 39% of stream miles are suboptimal, and 16.06% of stream miles are in optimal condition (Table 14). As with the overall habitat scores, the widespread impacts of sedimentation in West Virginia are apparent in that over 83% of the wadeable streams miles in the state score less than optimal.



The Ridge and Valley Ecoregion is better than both the Central Appalachian or the Western Allegheny Plateau Ecoregions regarding sedimentation. In the Ridge and Valley ecoregion, 37.87% of stream miles are in optimal condition and 3.32% are in poor condition. Results for the Central Appalachians are poorer than the Ridge and Valley ecoregion but better than the Western Allegheny Plateau Ecoregion, with 17.92% of stream miles in optimal condition and 5.06% of stream miles in poor condition. The Western Allegheny Plateau continued to show substantial problems in habitat quality. In contrast to the Ridge and Valley, less than 3% of stream miles in this ecoregion are in optimal condition and just under 61.53% of stream miles are in poor or marginal condition in terms of sedimentation. The presence of more widespread development and higher rates of soil erosion in this ecoregion are potential causes of the observed increase in sedimentation and resultant decrease in habitat quality.

Biological impairment

The biological communities living in West Virginia streams are exposed to many stressors, including toxic contaminants, sedimentation, nutrient enrichment, and acid precipitation. The DEP uses benthic macroinvertebrates to assess the biological condition of streams in the state. These organisms provide reliable information on water and habitat quality in streams. They are extremely diverse and exhibit a wide range of tolerances to pollutants. Further, they serve as an excellent tool for



measuring overall ecological health, especially when summarized into a single index of biological integrity. In West Virginia, the health of benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams. The WVSCI is composed of six metrics (each measuring a different aspect of the community) that were selected to maximize discrimination between streams with known impairments and reference streams. Based on the WVSCI impairment threshold of 60.6 (0 –100 scale) WVSCI, about 29.27% of wadeable stream miles in the state are in poor condition (i.e. impaired), while 58.99% of stream miles are not impaired and 11.74% are inconclusive (Table 15). More than 43% (43.09%) of the wadeable stream miles in the Western Allegheny Plateau were impaired. In contrast, the Ridge and Valley and Central Appalachians ecoregions had substantially lower percentages (14.15% and 23.70%, respectively) of wadeable stream miles rated as impaired biologically.' Poorer habitat conditions in the Western Allegheny Plateau, especially those related to sedimentation, are likely to be at least partially responsible for the higher proportion of stream miles rated as impaired biologically.

Table 16 **Biological Impairment Sources**

Sources of bio-impairment

The results of the 2005 - 2009 probabilistic sampling revealed that 146 out of 530 samples received a WVSCI score of 60.6 or less. Benthic macroinvertebrate communities that score below this value are considered impaired, and the DEP would describe them as not supporting their aquatic life use designation.

Eleven categories of major sources of biological impairment were determined using water chemistry analyses, narrative descriptions by sampling personnel, benthic community characteristics, and several Geographic Information System data layers depicting land use activities. Each of the 146 sites was assigned a primary source of impairment from one of the 11 categories. For sites with possibly more than one source of impairment, the most obvious source was listed. Of the 146 bio-impaired sites, "unspecified land disturbance" affected almost 33 percent. Unspecified land disturbances are characterized by heavy sand and sedimentation associated with dirt roads, poor riparian zones, and highly eroded areas. The next highest sources of impairments are mining and agriculture.

Major Basin Summaries

Dunkard Creek

The DEP recently completed, and the EPA approved, Total Maximum Daily Loads for iron, fecal coliform, chloride and biological impairment related to sediment. The fish kills that occurred in in the fall of 2009 were a new development caused by golden algae (Prymnesium parvum) and its associated toxins.

The West Virginia Department of Environmental Protection and the West Virginia Division of Natural Resources, along with a number of other agencies, have investigated the cause of a substantial fish kill in Dunkard Creek, in Monongalia County.

Members of the public first reported seeing dead fish in Dunkard Creek and notified the DNR on September 1, 2009. At that time, staff from a variety of divisions from the DEP and the DNR visited the scene, began taking samples and started looking for a cause.

Because of mining activity in the area, the industry was an early suspect. In fact, after conferring with the DEP, Consol, which operates an active mine in Blacksville, W.Va., agreed to shut off its discharge into Dunkard Creek at its Blacksville No. 2 site. However, at the same time Consol was shutting off its pumps, dead fish were found upstream from its outlet, indicating that the outlet at that site is not the sole cause for the dead fish.

The agencies also received reports from area residents suspecting tanker trucks of dumping wastewater from oil and gas drilling activities into Dunkard Creek. Further investigation revealed those trucks that had been reported were withdrawing water from the stream, rather than dumping wastewater.

On Friday, September 18, 2009 staff members from the DEP flew over the area in a helicopter to see if there was anything they could see from the air that they missed on the ground. The staff noted the stream was clouded with a rust color from the Pennsylvania border upstream to a beaver dam in the South Fork of the West Virginia Fork of Dunkard.

In addition, investigators solicited the assistance of micro-biologists to help determine whether some form of algae or similar growth was a contributing factor. Toxins are sometimes produced by algae; and saline environments are sometimes involved with harmful algae blooms.

Additional water samples for golden algae taken on September 24, 2009 reconfirmed the presence of golden algae in amounts known to have caused fish kills in other states and countries. The DEP and other investigators have been assembling available scientific information on golden algae and the toxins it produces. As reported in available scientific literature, both the golden algae and the toxins it produces are influenced by environmental factors including the water's pH, temperature, salinity and nutrients. Toxin production mainly kills fish and appears to have little effect on cattle or humans.

Guyandotte River

The Guyandotte River is divided into upper and lower sections. The confluence of Island Creek and the Guyandotte River defines the boundary between the Upper and Lower Guyandotte watersheds - The impairments of the Upper Guyandotte River mainstem (fecal coliform, total iron and biological impairment) and the Lower Guyandotte River mainstem (fecal coliform, total iron) are addressed by TMDLs developed by EPA Region III in 2004. In that effort, EPA also developed TMDLs for numerous Guyandotte River tributaries predominantly impaired by mine drainage. Currently, there are 44 streams within the Upper Guyandotte Basin and 52 streams in the Lower Guyandotte Basin which are listed as biologically impaired and in need of TMDLs.

Kanawha River and major tributaries (New, Bluestone, Greenbrier, Gauley, Elk and Coal rivers)

The Kanawha River is divided into two major sections with the break occurring at the mouth of the Elk River. The Upper Kanawha Basin extends upstream to the confluence of the New and Gauley Rivers in Gauley Bridge. The Lower Kanawha Basin begins at the mouth of the Elk River and extends downstream to its confluence with the Ohio River in Point Pleasant.

The entire Kanawha River mainstem, Bluestone River and Bluestone Lake are listed as impaired because of fish consumption advisories related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs).

Fecal coliform impairments have been identified in portions of the Lower Kanawha River mainstem and in all of the major tributaries of the Kanawha River. Affected segments include the New River (mouth to Bluestone Dam), the Elk River (mouth to river mile 102.5), and the entire lengths of the Bluestone, Coal, and Greenbrier Rivers.

Previous EPA TMDL development efforts addressed dioxin impairments of the Lower Kanawha River and tributaries (September 2000) and metals impairments of the Elk River and tributaries (September 2001). The West Virginia Department of Environmental Protection finalized numerous TMDLs for impaired tributaries of the Upper Kanawha River in January 2005. Additionally, DEP developed TMDLs for the Coal River and numerous impaired tributaries that were approved by the EPA in September 2006. DEP also developed numerous TMDLs in the Gauley, New, Greenbrier and Bluestone watersheds in 2008.

Currently, all tributaries of the Lower Kanawha and Lower Elk, from Summersville Dam to the mouth, are being evaluated by the DEP for TMDL development. Once sampling and stressor identification are complete, all tributaries with impairments, other than ionic stress, will have TMDLs completed by December 2010 under the current schedule.

Monongahela River and major tributaries (Tygart and West Fork rivers)

Between March 2001 and September 2002, the EPA developed TMDLs addressing the iron, aluminum, manganese and pH impairments of the Monongahela, Cheat, Tygart and West Fork Rivers and numerous tributary waters.

Fecal coliform impairments have been identified in the Monongahela River (entire length), the Tygart Valley River (entire length), and the West Fork River (mouth to Stonewall Jackson Lake Dam). The same segment of the West Fork River is also biologically impaired and a consumption advisory related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs). Cheat and Tygart Lakes are listed for PCBs. The PCB listing of these lakes are based on elevated fish tissue concentrations and fish comsumption advisories. Recent fish tissue sampling has resulted in delisting of the Monongahela River for PCBs.

In Spring 2009, the DEP announced plans to develop TMDLs on all impaired tributaries of the Monongahela River from its beginning at the confluence of the West Fork River and Tygart River to the West Virginia/ Pennsylvania border. Currently, water quality sampling and biological assessments are being conducted on all tributaries with known or suspected impairments. Once sampling is completed and all streams are assessed, the DEP will begin TMDL development for impaired waters. The DEP expects to submit the TMDLs to the EPA for approval by November 2012.

In March 2010, the DEP proposed a list of streams for TMDL development in the West Fork River Watershed. The streams were advertized in papers statewide seeking public input. A public meeting in the Summer of 2010 to present sampling plans and to address any questions or comments from the public. Pre-TMDL sampling began in July 2010 with draft TMDLs due to EPA by fall of 2013.

Cheat River Watershed TMDLs

The DEP and the EPA have initiated a large-scale revision of the Cheat River watershed TMDLs that the EPA developed in 2001. At present, pre-TMDL monitoring, impairment assessments, and source tracking and characterization activities have been completed and a work directive issued to perform water quality modeling. This effort is scheduled to be finalized in September 2010. The revision will involve re-evaluation of the metals and pH impairments associated with the 2001 TMDLs, in light of the aluminum and manganese water quality standard revisions that have occurred and the various water quality improvement projects in place throughout the watershed. In addition to the re-evaluation component, the new effort will also develop TMDLs for streams in the watershed where fecal coliform bacteria and/or biological impairments

have been identified. It is important to note that the pH water quality conditions of the Cheat River mainstem and Cheat Lake have shown dramatic improvement in recent times. The West Virginia Division of Natural Resources' limestone drum station on the Blackwater River and its application of limestone fines to headwater streams impacted by acid rain have restored many miles of trout water and pH data at the head of Cheat Lake has consistently indicated no impairment for the last four years. Several AMD restoration projects have also been completed in the watershed.

Little Kanawha River

A small headwater section from river mile 162 upstream to the headwaters is currently listed for pH impairment. The segment of the river from Burnsville Dam (river mile 132.6) downstream to the mouth is impaired by fecal coliform and has a fish consumption advisory for PCBs.

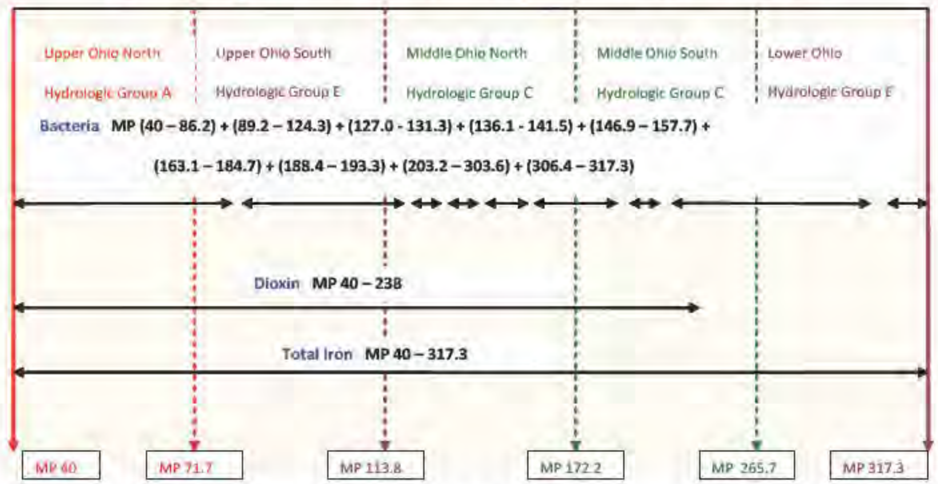
Previously, the EPA developed iron and aluminum TMDLs for the mainstem and several tributaries. The previously developed total aluminum TMDLs are now obsolete due to the criteria revisions that occurred in 2006. In addition, the DEP has received approval from the EPA for TMDLs on four additional tributaries (Copen Run, Duck Creek, Duskcamp Run and Lynch Run) for various impairments including: total iron, total manganese, pH and biological impairments.

Ohio River

In 2000 and 2002, EPA developed TMDLs for dioxin and PCBs, respectively for the Ohio River mainstem. The EPA TMDLs for dioxin included only sections of the Ohio River from the mouth of the Kanawha River downstream to the Kentucky state line. Additional sections of the river above the Kanawha River remain listed as impaired by dioxin. Currently, TMDLs have been or are being developed to address various impairments on many of the tributary streams.

The Ohio River Valley Water Sanitation Commission does extensive water quality monitoring of the Ohio River bimonthly. In addition, every two years, ORSANCO publishes a 305(b) report that provides assessments of the water quality based on ORSANCO water quality standards. As in the past, the DEP has reviewed the data and incorporated these assessments into the West Virginia Section 303(d) List.

Figure 3 - Impairments of the West Virginia section of the Ohio River



When both West Virginia and ORSANCO have an established criterion for a particular pollutant the most stringent standard is applied for assessment purposes and included in West Virginia's Section 303(d) List. For example, the bacteria impairment identified for various Ohio River segments is based upon both ORSANCO's E. coli. water quality criteria and West Virginia's fecal coliform criteria. In addition, the river continues to be identified as iron-impaired based upon the application of West Virginia's warmwater aquatic life criterion of 1.5 mg/l. Figure 3 depicts the impairments and segment lengths for the Ohio River bordering West Virginia.

Tug Fork River

In 2002, the EPA developed TMDLs for total iron and total aluminum for the Tug Fork River mainstem. In addition, total iron, total aluminum, total manganese and pH TMDLs were developed for its impaired tributaries. As noted earlier, subsequent revisions to the aluminum and manganese criteria have created uncertainty relative to the impairment status of affected waters and, as such, the validity of many the total aluminum and manganese TMDLs.

Currently, the Tug Fork is identified on the 2010 West Virginia Section 303(d) List for violations of the fecal coliform criteria and biological impairment. The fecal coliform impairment extends the entire length of the river and the biological impairment reaches from river mile 51.6 to the headwaters.

Interstate Water Coordination

Joint PCB monitoring and TMDL development effort with Virginia

DEP has been working with the Virginia Department of Environmental Quality (Va. DEQ) to assess Polychlorinated Biphenyls (PCBs) impairment along the Virginia section of the Bluestone River. The product of this cooperative effort will be a TMDL for the Bluestone River and tributaries with loadings and allocated reductions for sources in both Virginia and West Virginia. The USGS report detailing analytical method and sample results can be found at http://pubs.usgs.gov/of/2007/1272/pdf/OFR2007-1272.pdf. In addition, the DEP, Va. DEQ and EPA Region III have been cooperating in an effort to locate and reduce sources of PCBs to the Bluestone River. As part of this effort, remediation of the now defunct Lyn Electric Site in Bluefield, W.Va. has been completed. Efforts included leveling and removal of the electric motor remanufacturing buildings on the site. Also, contaminated water and debris were removed from the site and clean material used to backfill the open basement areas of the property. Within the watershed additional monitoring and source evaluation is on going to determine what steps need to be taken in the near future.

Ohio River Valley Water Sanitation Commission – ORSANCO

As with previous reports, the DEP's 2010 Integrated Report includes assessments based on data provided by ORSANCO. Throughout the development of ORSANCO's 2010 Biennial Assessment, the DEP has been involved with ORSANCO's efforts to standardize assessments among the "compact" states. The DEP's personnel continue to participate in several standing committees, along with representatives from other "compact states," charged with helping direct ORSANCO's water quality and biological monitoring efforts.

Chesapeake Bay

The Chesapeake Bay is impaired by nutrients and sediment from multiple sources originating locally and in upstream states. This biologically diverse waterbody is an important economic and recreational resource.

The need to restore this waterbody is a high priority for many agencies, organizations and the public in general. Fourteen percent of West Virginia's waters drain into the Potomac River and on into the Bay. In addition, portions of the James River Watershed in West Virginia contribute flow to the Bay.

In June 2002, Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding, committing West Virginia to the nutrient and sediment load reductions. The West Virginia Potomac Tributary Strategy, developed in November 2005, includes plans for nutrient and sediment reductions from a variety of state point and nonpoint sources. All other Bay jurisdictions have developed and are implementing similar plans. Many DEP programs are actively participating in the development of a Chesapeake Bay TMDL, which is scheduled to be completed in December 2010.

Interstate Commission on Potomac River Basin

The Commission is a non-regulatory agency of basin states (Maryland, Pennsylvania, Virginia and West Virginia), Washington, D.C. and the federal government. The Commission promotes watershed-wide solutions to the pollution and water resources challenges facing the basin and its more than 5.3 million residents. Examples of current commission efforts include the Chesapeake Bay Program involvement, stream biological assessments, support of selected stream gages, the Potomac Groundwater Assessment, Potomac Basin Drinking Water Source Protection Partnership coordination and Potomac Watershed Toxic Spill Model support. In addition, the Commission's public outreach program supports and helps coordinate an annual watershed-wide clean up effort and produces and distributes 150,000 copies of the newsletter Potomac Basin Reporter. The commissioners are appointed by their respective jurisdictions and provide policy guidance and oversight for a skilled staff of scientists and educators.

Ohio River Basin Water Resources Association

The association, in some form or another, was founded in 1981. The association works to: (1) provide a forum for Ohio River Basin states to study, discuss, and develop regional policies and positions on common interstate issues concerning water and related land resources; (2) coordinate to the extent possible water and related land resources planning in the Ohio River Basin; (3) provide representation of regional interest to the federal government; (4) investigate, study and review water related problems of the basin; (5) assist in water and related land resources training for basin representatives. The association welcomes membership from all states draining to the Ohio river including: Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia. Recently the organization has changed it name to the Ohio River Basin Water Resources Association and has signed a Memorandum of Understanding with ORSANCO to seek ways for the organizations to work together more efficiently.

Total Maximum Daily Load (TMDL) Development Process

From 1997 until 2003, EPA Region III developed West Virginia TMDLs under the settlement of a 1995 lawsuit, Ohio Valley Environmental Coalition, Inc., West Virginia Highlands Conservancy, et. al. v. Browner, et. al. The lawsuit resulted in a consent decree between the plaintiffs and the EPA that specifies TMDL development requirements and compliance dates. While the EPA was working on developing TMDLs, the DEP concentrated on building its own TMDL program. With the help of the TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL section within the Division of Water and Waste Management.

The TMDL section is committed to implementing a TMDL process that reflects the requirements of TMDL regulations, provides for the achievement of water quality standards, and ensures that ample stakeholder participation is achieved in the development and implementation of TMDLs. The DWWM's approach to TMDL development allows 48 months to develop a TMDL from start to finish. This approach enables the agency to carry out an extensive data generation and gathering effort to produce scientifically defensible TMDLs, and allows ample time for modeling, report drafting and frequent public participation opportunities.

The DEP's TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year, five-step process. The watersheds are divided into five hydrologic groups (A - E). Each group of watersheds is assessed once every five years. A map depicting the 32 watersheds and hydrologic groupings is provided as an attachment to this document before the List Key. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the NPDES permitting process and efforts toward limiting nonpoint source loading. Throughout the TMDL development process, there are numerous opportunities for public participation and input. Since its inception, the DEP's TMDL section pursued timely development of TMDLs for the waters and impairments identified in the consent decree between the EPA and the Ohio Valley Environmental Coalition, et. al. The TMDLs developed and approved in the Dunkard Creek, Upper Ohio River South, Youghiogheny, and Camp Creek portion of the Twelvepole Creek watersheds in 2009 fully accomplished the EPA's commitments under the consent decree.

The 303(d) list identifies and prioritizes the waters and impairments for which future TMDLs will be developed by specifying the year in the "Projected TMDL Year" column. The impaired waters intended for TMDL development in 2010, 2011 and 2012 are known and identified. For other waters and impairments, where the timing of TMDL development is less certain, the "Projected TMDL Year" is identified as the latest year where an opportunity exists per the DEP's plans to develop

TMDLs in concert with the Watershed Management Framework.

At any point in time, the DEP personnel is working on TMDLs in each of the five hydrologic groups (A-E). Each set of TMDLs moves through several stages of development prior to finalization and the EPA's approval. Table 17 shows the state's TMDL development progress.

The DEP's Web site contains all approved TMDL documents and the draft TMDL documents currently out for public comment. These documents can be found at http://www.dep.wv.gov/WWE/watershed/TMDL/Pages/default.aspx.

Table 17 - West Virginia TMDL development progress

Hydrologic Group	Watersheds	Progress
E1	Dunkard Twelvepole Upper Ohio South	U.S. EPA approved in 2009
A1	Youghiogheny	U.S. EPA approved in 2009
A2	Cheat	Allocation development process underway Draft TMDLs expected summer 2010
B2	Elk Lower Kanawha North Branch of the Potomac	In model development process draft TMDLs expected fall 2010
C2	Middle Ohio North Middle Ohio South	In model development process Draft TMDLs anticipated in 2011
D2	Monongahela	Pre-TMDL monitoring and source characterization ongoing (July 2009 - June 2010)
E2	West Fork (tentative)	Stream selection was advertised in March 2010

Water Pollution Control Programs

Division of Mining and Reclamation

The mission of the Division of Mining and Reclamation (DMR) is to regulate the mining industry in accordance with federal and state law. Activities include issuing both National Pollutant Discharge Elimination System and Surface Mining Control and Reclamation Act permits for mineral extraction sites and related facilities, inspecting facilities for compliance, monitoring water quality, tracking ownership and control, and issuing and assessing violations. The DMR is responsible for the computer databases that track the DMR's activities - Environmental Resources Information System and Applicant Violator System the federal database. The Permitting Unit is responsible for reviewing permit applications for surface and underground coal mines, preparation plants, coal loading facilities, haulage ways, and coal-related dams. This unit also reviews permit applications for non-coal quarry operations (sand, gravel, limestone, etc). Permit review teams staffed with geologists, hydrologists, engineers and others are located in each regional office throughout the state and in the headquarters office. The DMR's Inspection and Enforcement unit is responsible for inspecting all coal mining and quarry operations in the state. It enforces compliance through regular inspections and Notices of Violation, and ensures site reclamation through final release of the operation. This unit is also responsible for civil penalty assessments, show cause proceedings, bond forfeiture and collection. The DMR's Program Development unit is responsible for implementing a proactive approach to policy issues, legislation and training. This unit is designed to keep the Division staff current with technological advances and to provide clear direction through development of cogent policy and guidance to meet legal and regulatory requirements. This unit provides regulatory interpretation and support to field offices, develops and updates handbooks and forms, drafts legislation and initiates regulation changes. Other responsibilities of this unit include Small Operators Assistance Program, public relations, including responses to Freedom of Information Act requests, special projects, employee training and research of laws, regulations and policy.

Division of Water and Waste Management

The Division of Water and Waste Management's mission is to preserve and enhance West Virginia's watersheds for the benefit and safety of all.

The DWWM strives to meet its mission through implementation of programs controlling surface and groundwater pollution caused by industrial and municipal discharges as well as oversight of construction, operation and closure of hazardous and solid waste and underground storage tank sites. In addition, the division works to protect, restore and enhance the state's watersheds through comprehensive watershed assessments, groundwater monitoring, wetlands preservation, inspection and enforcement of hazardous and solid waste disposal and proper operation of underground storage tanks.

Environmental Enforcement (EE) is a branch of the Division of Water and Waste Management charged with assuring compliance with many of the state pollution control regulations. EE promotes compliance with the Solid Waste Management Act, Water Pollution Control Act, Groundwater Protection Act, Hazardous Waste Management Act, Underground Storage Tank Act, and Dam Safety Act by providing assistance, inspecting regulated sites, and enforcing conditions required by these acts.

National Pollution Discharge Elimination System (NPDES) Program

The DWWM's primary mechanism for controlling point sources is the West Virginia NPDES permitting program. This program, administered by the Permitting Branch, regulates activities and facilities involved in the installation, construction, modification, and operation and maintenance of wastewater treatment systems as well as their discharges. Individual and general permits are used to implement the program. Most permits include effluent limits and requirements for facility operation and maintenance, discharge monitoring and reporting. Other permits require the installation and implementation of best management practices in lieu of effluent limitations and discharge monitoring requirements. The Permitting Branch also administers a pretreatment program in conjunction with the NPDES program, which outlines procedures for regulating proposed industrial wastewater connections to publicly owned treatment works. The program imposes discharge limitations for indirect discharges and requires the installation of pretreatment facilities where necessary to prevent interference with POTW operations and sludge disposal practices and to ensure that the pollutants contributed by industrial users do not pass through the POTW and violate water quality standards. The National Combined Sewer Overflow (CSO) Policy is implemented as a component of the NPDES Permits for POTWs with CSOs. The DEP is also working with several state and federal agricultural agencies to develop a Concentrated Animal Feeding Operation (CAFO) permitting program. Activities administered by the Permitting Branch include the regulation of industrial solid waste landfills and the land application of sewage sludge, and developing wasteload allocations for new or expanding sewage treatment facilities. Below is a list of permit actions for the time period beginning in July 2007 and ending in June 2009.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
Report Date 02/12/2010

NPDES PERMITTING - PERMIT ACTION REPORT (7/1/2007 - 6/30/2009)

	Applications Received This Period	Applications Denied this Period	Permits Registrations and Modifications Issued This Period	Permits Registrations and Modifications Issued Year-to-Date for Current Fiscal 2010	Withdrawn and Voided This Period	Applications Pending as of 6/30/2009: Greater Than 180 dep days	Less Than, 180, > 90 dep days	Less Than, Equal to 90 dep days	Total (dep days)	Greater Than 180 total days	Average DEP Time to Issue Permits This Period (In Days)	Average Total Time to Issue Permits This Period (In Days)
INDIVIDUAL PERMITS	214	0	216	65	2	13	14	26	53	21	164	180
GENERAL PERMITS												
Home Aeration Units	590	2	556	1081	14	0	0	68	68	53	18	44
Sewage General	27	0	27	12	1	0	0	12	12	9	96	146
Storm Water Construction	1316	0	1285	317	30	0	1	68	69	12	27	33
All Others	937	1	517	670	20	1	6	441	448	59	81	141
MODIFICATION PERMITS	410	2	367	93	36	14	8	54	76	31	73	84
TRANSFER PERMITS	342	0	330	31	10	1	1	27	29	9	17	36
TOTAL - PERMITS	3835	5	3300	2269	113	29	30	716	775	194		

NOTE: The permits used to calculate for the "Average DEP Time" column are those that were submitted after June 30, 1999, when ERIS was deployed for Division of Water and Waste Management.

In addition to permitting, compliance assessment and enforcement activities are coordinated between the Permitting Branch and Environmental Enforcement. Noncompliance is initially addressed by administrative actions to compel compliance. These may include warning letters, notices to comply, enforcement orders, or referrals for civil action.

Nonpoint Source Control Program

The Nonpoint Source Control Program focuses on restoration and protection of streams from nonpoint source pollution. The program assesses nonpoint source impacts, then develops and implements watershed based plans and projects designed to reduce pollutant loads from agricultural, silviculture, resource extraction, urban runoff, construction activities, and failing septic systems. Program initiatives are based upon education, technical assistance, financial incentives, demonstration projects, and enforcement, as necessary. The division's Nonpoint Source Program supports overall administration and coordination of the nonpoint source activities through these participating state agencies: the West Virginia Conservation Agency, the Office of Oil and Gas, and the Division of Health and Human Resources. Each year, specific activities are funded under the Nonpoint Source Program. Many of the streams being listed on the state's list of impaired waters are affected by nonpoint sources. The majority of the Total Maximum Daily Loads being developed involve nonpoint source water quality impacts. To more effectively respond to TMDL implementation needs, the Nonpoint Source Management Plan was updated in 2000 to incorporate watershed management principles, including integration of TMDL and Watershed Management Framework scheduling. Since then, the Nonpoint Source Program has developed 16 watershed based plans that address a variety of nonpoint sources of pollution. These plans are developed in cooperation with the stakeholders, including federal, state and local government agencies, within the watershed. As a result of these plans, numerous nonpoint source remediation projects for acid mine drainage, agriculture, streambank erosion, and dirt roads have been undertaken. The goal of the watershed based plans is to restore the impaired streams to meet water quality standards. The successes to date emphasize the need to focus more resources on voluntary installation of best management practices in identified priority watersheds where local stakeholders are interested in making a difference.

Groundwater Program

Under the Groundwater Protection Act, West Virginia Code Chapter 22, Article 12, Section 6.a.3, the DEP is required to provide a biennial report to the Legislature on the status of the state's groundwater and groundwater management program, including detailed reports for each agency that has groundwater regulatory responsibility. The current biennial report to the Legislature covers the period from July 1, 2007 through June 30, 2009. Copies of the report "Groundwater Programs and Activities: Biennial Report to the West Virginia 2010 Legislature" may be obtained by contacting the Groundwater Program at the Division of Water and Waste Management, 601 57th St., Charleston, WV 25304 or by calling (304) 926-0495. The report also may be reviewed at http://www.dep.wv.gov.

The Groundwater Program is responsible for compiling and editing information submitted for the biennial report. The DEP, the West Virginia Department of Agriculture and the West Virginia Department of Health and Human Resources all have groundwater regulatory responsibility and contribute to the report. These state boards and six standing committees currently share the responsibility of developing and implementing rules, policies and procedures for the Ground Water Protection Act (1991). The Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Nonpoint Source Coordinating Committee are the standing committees. The report provides a concise, thorough overview of those programs that are charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia.

The Ambient Groundwater Quality Monitoring Network was established by the DWWM in cooperation with the USGS in 1992 and is an ongoing project. The network provides critical data needed for proper management of West Virginia's groundwater resources. The major objective of this USGS study is to assess the ambient groundwater quality of major systems (geologic units) within West Virginia and to characterize the individual systems. Characterization of the quality of water from the major systems helps to:

- Determine which water quality constituents are problems within the state
- Determine which systems have potential water quality problems

- Assess the severity of water quality problems in respective systems
- Prioritize these concerns

Only by documenting present ambient groundwater quality of the state's major systems can regulatory agencies assess whether water quality degradation has occurred in certain areas and whether potential degradation is a result of natural processes or those associated with human activity. Spatial variability in water quality is determined for specific geologic units based on sampling of approximately 30 wells annually. The sampling continues over a period of approximately six years and provides a database of more than 200 wells from which comprehensive water samples are collected. Wells are selected in specific drainage basins in given years, rotating annually to new basins, thus providing sampling of groundwater in all watersheds of the state over the five year period. Then, the cycle of sampling begins again. All associated groundwater quality data for each well sampled and summaries of groundwater quality for each respective watershed are published in the USGS Water Resources Data for West Virginia annual report.

Cost Benefit Analysis

A true cost/benefit analysis on the economic and social costs and benefits of water pollution control is a difficult and time consuming task. Particularly, the evaluation of industrial facilities would be a monumental task considering the various types of industry (mining, chemical, power generation, etc), each having a very different process of pollution control. However, the information contained in the following paragraphs provides an idea of the amount of money currently expended to construct and upgrade both the municipal facilities within the state as well as programs available to homeowners wanting to correct failing onsite sewage systems.

Funding for Water Quality Improvements
The DEP is responsible for administering a combination of state and federal funds expended for projects to improve water quality in state streams. The following narrative provides an overview of the programs within the DEP's Office of Water and Waste Management that provide funding for water quality improvements and a summary of the funds dispersed between July 2007 and June 2009 to improve water quality.

Clean Water State Revolving Fund Program
Clean Water State Revolving Fund (CWSRF) program is a funding program administered by the State Revolving Fund Branch to address water quality problems through wastewater facility construction, upgrades, or expansions. The branch is charged with general oversight, fiscal management and administrative compliance review of local governmental entities that receive funds and provides information and guidance on what administrative actions are needed to process a loan through the program. When a community has been recommended by the West Virginia Infrastructure and Jobs Development Council to seek CWSRF program funding for financial assistance, the community is contacted by a financial manager. A meeting may be scheduled to advise the community leaders about the overall program requirements and specifically what they should do next to obtain a CWSRF loan. There are federal, state, and program requirements that must be met prior to scheduling a loan closing. The CWSRF currently has three financial assistance programs available. These programs are described below.

Low Interest Loan Program
A low interest loan program for construction of municipal wastewater treatment works is available for municipalities and public service districts to build, upgrade, or expand treatment facilities and collection systems. Conventional loans with a repayment period of 20 years are available with an interest rate and annual administrative fee not exceeding 3% for certain communities. Loans with repayment periods from 21 to 40 years are available for disadvantaged communities where financial affordability is an issue. The interest rate and annual administration fee on these loans do not exceed 1/2%. From July 2007 through June 2009, 35 wastewater treatment facility loans totaling $85,807,285 were funded.

Agriculture Water Quality Loan Program

The Agriculture Water Quality Loan Program is a partnership with the West Virginia Conservation Agency developed to address pollution from nonpoint sources using Best Management Practices approved by the U.S. Environmental Protection Agency. CWSRF money is loaned to participating banks so they can offer below market rate low interest loans to qualifying applicants. For more information, contact your local Conservation District office, http://www.wvca.us/directory/cdo.cfm. From July 2007 through June 2009, 31 nonpoint source agriculture BMP loans totaling $1,615,118 were funded.

Onsite Systems Loan Program

In cooperation with the West Virginia Housing Development Fund, a low interest loan program has been established to address onsite sewage disposal problems. Called the "Onsite Systems Loan Program," loans up to $10,000 are available to replace malfunctioning septic systems and to install new onsite sewage systems for homes that have direct sewage discharges to ditches and streams. Centralized treatment for these homes will not be available in the next five years. For the current reporting period of June 2007 through June 2009, a total of 62 systems were funded at a cost of $407,409.

In conclusion, although funding for maintenance and improvement of water quality is often a controversial issue, the DEP recognizes that millions of dollars are expended annually by businesses, municipalities, private and public entities (including state and federal agencies) to improve and maintain water quality in West Virginia. These expenditures address pollutants from various media including solid and hazardous waste, air and water.

Public Participation and Responsiveness Summary

The draft Section 303(d) List was advertised for public comment from March 15, 2010 through May 19, 2010. This period included a 30-day extension granted by the agency after requests for additional time to fully develop comment submissions were received from multiple entities. Legal notices of the availability of the draft document were placed in newspapers statewide, including requests for public comment. The draft document was promoted via news release, e-mail and the Internet. At the conclusion of the public comment period, the DEP considered all comments and made adjustments to the list where appropriate.

Table 18 identifies all entities that provided comments. All relavant comments have been compiled and responded to in this responsiveness summary. The DEP appreciates the efforts commenters have put forth to improve West Virginia's listing and TMDL development processes. Comments and comment summaries are bold and italicized. Agency responses appear in plain text.

Table 18 - 2010 Section 303(d) List Commenters

Argus Energy WV, LLC	Patriot Coal	Linda Lee Elliston Emrich
ICG Beckley, LLC	PPG Industries	City of White Sulphur Springs
Town of Ronceverte	Arcelor Mittal	West Virginia Manufactors Association
Tunnel Ridge, LLC	Arch Coal, Inc.	West Virginia Chamber of Commerce
Arthur W. Dodds	Pamela C. Dodds	West Virginia Coal Association
Duane Nichols	Hunter Ridge	American Electric Power
Kim Shiemke	Tom Danek	

The following issues were raised by commenters relating to the listing of numerous state waters for mercury:

- ***The use of total mercury fish tissue results to assess a methyl mercury criterion.***
- ***The use of fish tissue fillet results to assess to assess a total organism body burden criterion.***
- ***The lack of a demonstrated > 10% rate of exceedance for methyl mercury in the most recent sampling of fish from the Kanawha River.***
- ***The use of individual composite sample results rather than a trophic level weighted geometric mean for assessing impairment.***
- ***The use of ORSANCO's total mercury data and more restrictive 0.3 ug/g standard to assess methyl mercury impairment on the Ohio River.***

The existing mercury listings for West Virginia waters were based on total mercury sample results from composites of fish fillets. Previous listings were based on the EPA guidance recommending states could equate total mercury levels in fish tissue to methyl mercury levels. In the guidance, the EPA suggested that total mercury concentrations in fish tissue could be assumed to represent methyl mercury concentrations for the purpose of listing. Language from the EPA document Water Quality Criterion for the Protection of Human Health: Methylmercury (2001) states in part "the MSRC concluded, based on research conducted by Bloom (1992) and Morgan et al. (1994), that over 90% of the mercury present in fish and seafood is methyl mercury. Thus, total mercury concentrations are considered appropriate for evaluation of methyl mercury exposure in human populations."

However, the DEP recognizes that proper assessments must be made in accordance with approved water quality standards. In the case of mercury, comments correctly point out that the criterion calls for whole fish samples, analyzed for methyl mercury. Studies were provided indicating mercury concentrations in fillets may be higher than those in whole body samples and that the methyl mercury to total mercury ratio in fish tissue may not be as high as the EPA's general statements indicate. As such, the DEP cannot conclude that the standards have been properly applied, and will remove existing listings for mercury.

The DEP is in the second year of a two-year study to evaluate statewide advisories for mercury and will analyze a percentage of fish collected for both methyl and total mercury to determine an appropriate ratio for future assessment purposes. However, all current fish consumption advisories will remain in place.

As the agency is proposing delisting of mercury impairments based upon the total/methyl and fillet/whole body issues, the requests for delisting based upon exceedence frequency and averaging are moot at this time. However, the DEP does not agree that the listing methodologies for water column numeric criteria would be appropriate for consideration of fish tissue results. The EPA mercury implementation guidance relative to trophic level weighting will be considered in future assessments.

The Ohio River listings were included to honor the initial draft assessments made by ORSANCO for portions of the Ohio River. The DEP has since been informed by ORSANCO of its plan to change the original assessments for mercury and proceed with additional sampling to better understand the relationship of total to methyl mercury for Ohio River fish. As such, the DEP has also removed the Ohio River mercury listings from the draft list.

Two commenters requested the removal of the CNA-Algae listing for the Greenbrier River (WVKNG). One commenter stated that the condition "does not constitute a danger at this time." The second commenter stated that they believe "the river is not failing to meet its designated uses."

The DEP does not agree with these comments. As described in the Narrative Water Quality Criteria - Greenbrier River Algae section of this document, the DEP believes that the excessive growth of algae does constitute a loss of designated uses for the listed segment of the Greenbrier River. The DEP has determined the existence of conditions prohibited by 47 CSR 2 Section 3.2 and causation by a pollutant. The state's Environmental Quality Board in a recent ruling (Appeal Nos. 09-05-EQB and 09-08-EQB) called the problems in the Greenbrier River undeniable and stated that designated uses have been jeopardized. As such, the DEP is retaining the Greenbrier River listing.

The classification of Big Sandy Creek (WVMC-12) as a trout stream was disputed because it is not listed in Appendix A of 47 CSR 2 and is not believed to be a cold water fishery. The delisting of iron, dissolved aluminum and pH impairments was requested.

The commenter correctly stated that available water quality monitoring data for Big Sandy Creek does not indicate impairment pursuant to dissolved aluminum criteria for warmwater fisheries and that Big Sandy Creek is not included in Appendix A of 47 CSR 2. Appendix A is not a comprehensive lists of trout waters and the DEP applies the trout water designated use and associated criteria to any stream believed to meet the definition at 47CSR2 – 2.19:

> *"Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.*

Alternatively, a stream that currently does not support year-round trout populations may also be properly classified as a trout water if that use was documented to be an existing use pursuant to the definition of "Existing uses" at 47CSR2 – 2.6 and the Tier 1 protection requirements of the Antidegradation Policy at 47CSR 2 – 4.1.a:

> *(2.6) "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included in the water quality standards.*
>
> *(4.1.a.) Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.*

When classifying trout waters, the DEP relies heavily on the guidance of the Division of Natural Resources. After receipt of the comment, the DEP reviewed available documentation and consulted with the Division of Natural Resources. Both agencies agree that Big Sandy Creek is more appropriately classified as a warmwater fishery. As such, the dissolved aluminum (trout) impairment was removed from the list. Iron and pH impairments remain indicated as "TMDL Rev." because existing

TMDLs previously developed by the EPA are being reevaluated in the Cheat River Watershed TMDL development project. Within that project, reevaluation will be based upon the criterion for warmwater fisheries.

Two commenters requested delisting of the iron impairments of the Ohio River. The following issues were raised:

- **Available data for certain pools does not demonstrate a greater than 10% rate of exceedance**
- **Available data at certain locations indicates no violations in the past two years**
- **The great majority of the iron in the Ohio River (Upper North) is naturally occurring and due to runoff of surface soils into the River**
- **Iron concentrations in the Ohio River (Upper North) do not pose a threat to human health or aquatic life and do not demonstrate that an impairment exists.**

In the West Virginia 2008 Section 303(d) List, the entire length of the Ohio River is listed as impaired for iron. Delisting requires adequate documentation that the impairment no longer exists. The data available for assessment is generated by ORSANCO and includes multiple locations. The WVDEP's listing methodology is point-based rather than pool-based.

Over the five year assessment period for the 2010 Draft 303(d) List, a greater than 10% rate of exceedance of the West Virginia iron water quality criteria was observed at mile points 42.6, 84.2, 126.4, 203.9 and 341. A less than 10% rate of exceedance was observed at mile points 54.4, 161.8 and 279.2. The West Virginia listing methodology extends an impaired condition in both directions until a non-impaired condition is observed. Based on that methodology, the entire length of the Ohio River is impaired for iron.

The listing methodology provides flexibility to override a five year assessment if no violations are observed in the most recent two-year period and the agency is convinced the impairment no longer exists. One commenter correctly stated that no iron violations are observed at mile point 84.2 from July 2007 to June 2009. However, the agency is not convinced that monitoring during that period confirms a non-impaired condition. Monitoring at mile point 84.2 on March 17, 2010 revealed a total iron result of 3.296 mg/l. In addition, further examination of the Ohio River data obtained from ORSANCO indicates a positive relationship between total suspended solids (TSS) and total iron. The relationship shows that as TSS values rise there is a corresponding increase in total iron values. Samples obtained in the last two years have not captured TSS values reaching the levels noted in previous samples with iron violations. As such, the DEP cannot state with confidence that the current iron levels in the Ohio River no longer violate water quality criteria. In the evaluation performed in response to these comments, the DEP determined that it erred when proposing delisting of a portion of the lower segment of the Ohio River and is retaining the entire length impairment of the 2008 list.

The DEP is aware that iron is present in native soils and sediment from numerous sources can cause violations of the water quality standards. However, the current EPA approved water quality criteria for West Virginia is total iron and according to federal regulations must be used in assessing waters for Clean Water Act purposes. The DEP does not have conclusive information that observed iron concentrations in excess of criteria are naturally occurring. The 2010 Draft Section 303(d) List must be based on effective water quality standards, which currently do not include a site-specific criterion for iron in the Ohio River.

Several commenters requested that DEP implement a Total Dissolved Solids (TDS) standard to protect the environment.

West Virginia does not currently have a TDS standard applicable to its waters. Without a standard, the DEP cannot list a stream on the impaired streams list for TDS. A TDS criterion has been recommended in the state's triennial review of water quality standards.

A perceived lack of action by the DEP was expressed in regard to several streams in the Dunkard and Monongahela watersheds that the

commenter believes are impaired.

The DEP has previously listed many of the streams/impairments noted in the comment and the EPA and/or the DEP have developed TMDLs as identified in Supplemental Table B. The DEP is currently pursuing a new TMDL development project for impaired tributaries of the Monongahela River. This effort will reevaluate TMDLs developed by the EPA in 2002 and will also address newly identified impairments. A comprehensive “Pre-TMDL” monitoring program has just been accomplished but was not available for assessment in the 2010 cycle. This data is being assessed now and identified impairments will immediately proceed to TMDL development. The impairments will be identified on the 2012 303(d) list and TMDLs are planned to be finalized by December 31, 2012. In summary, all waters named by the commenter either have or are having TMDLs developed.

A commenter requested that “the DEP recognize and emphasize the role of sediment and turbidity as causes for stream impairment.” The commented also requested NPDES permitting and enforcement program enhancements to restrict discharges of storm water associated with construction activities in sensitive areas.

The DEP recognizes the role that sediment plays in stream water quality. Elevated suspended solids can be associated with exceedances of total iron water quality criteria and sedimentation is often determined to be a significant stressor of biologically impaired streams when TMDLs are developed. However, stream-specific cause and effect relationships cannot be accurately determined with the limited information that is available at the time of listing. In the TMDL development process, streams listed for iron and/or biological impairment undergo evaluation of sediment contributions both from upland sources and streambank erosion. After extensive modeling, TMDLs establish allocations for existing point and nonpoint sources that are necessary to restore designated uses. The Construction Stormwater General Permit requires application of Best Management Practices (BMPs) that are designed to minimize water quality impacts. TMDLs also address new discharges and include requirements that limit the amount of disturbed area concurrently registered under the Construction Stormwater General Permit.

Multiple commenters stated that the WVSCI is an inappropriate mechanism for assessing narrative criteria because it has not been promulgated as a water quality standard by the West Virginia Legislature and has not been subject public notice and comment.

The basis for biological impairment listings is the narrative water quality criterion at Title 47 Series 2 Section 3.2.i of the Code of State Rules, which prohibits significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. This narrative criterion is a valid water quality standard that was promulgated by the West Virginia Legislature and approved by the EPA.

Under the Clean Water Act and implementing regulations, the DEP must assess State waters with respect to attainment of water quality standards via comparison of available information to both numeric and narrative water quality criteria. The DEP initiated biological integrity assessments in the 1998 Section 303(d) list. The WVSCI was first used in the 2002 Section 303(d) listing process and has remained as an integral component of all subsequent 303(d) lists. The DEP’s position has not changed relative to its responsibility to list waters where available data indicates significant adverse impact to their biological components. Furthermore, list approval by the EPA is expected to be contingent upon our continued implementation of this practice.

The WVSCI was specifically designed to accomplish assessment with respect to the 47CSR2 - 3.2.i criterion and remains the best scientific tool available to the DEP for that purpose. It was developed for the EPA and the DEP by national experts in the assessment of biological integrity through the evaluation of benthic macroinvertebrate communities. It is similar to the multi-metric indices used by many states and its component metrics are both validated and widely used nationally when assessing biologic health of aquatic systems.

Over the long period of WVSCI application, there have been numerous

opportunities for public notice and comment. Prior to the 2010 effort, the WVSCI has been applied in four West Virginia Section 303(d) lists and each of those processes included public notice and comment provisions. Previous Section 303(d) lists have generated public comments relative to biological impairment and application of the WVSCI. The DEP conscientiously considered and responded to all such comments. The EPA reviewed public comments and the DEP responses and, in their list approvals, concluded that the DEP properly assessed biological data and properly considered and responded to public comments.

A commenter contended that the DEP's sole reliance on the WVSCI methodology constitutes an improper evaluation of the overall biological integrity of an aquatic ecosystem which requires a more comprehensive assessment to include habitat and fish populations. The following excerpt from DEP Cabinet Secretary Randy Huffman's June 25, 2010 testimony to the Senate Committee on Environment and Public Works, Subcommittee on Water and Wildlife was also included to support the comment:

> ***These tools are just that, tools. They are not stand alone determinants of compliance with the narrative criterion. Any application of these assessment tools in determining compliance with the narrative criterion must faithfully apply the language of the standard itself, which prohibits significant adverse impacts on the biological component of the aquatic ecosystem.***

The commenter also included excerpts from a recent resolution of the West Virginia Legislature and suggested that the use of WVSCI "wholly disregards the Legislature's mandate as expressed in House Concurrent Resolution No. 111 and simultaneously betrays the very spirit and intent of the WVWPCA."

In reference to Secretary Huffman's Senate testimony, the commenter omitted text that is contextually important. The theme of the paragraph disputed conclusions that result from application of the draft GLIMPSS methodology. Preceding the excerpted text, the paragraph clearly indicates two points: GLIMPSS has not been put into regulatory use and the DEP uses the WVSCI to assess biological integrity under the narrative water quality criterion. The concluding sentence of the paragraph states:

> *In that regard, the WVDEP considers streams with less than 60.6 as biologically impaired.*

The DEP's use of WVSCI to assess 47CSR2-3.2.i is consistent with the Secretary's testimony.

House Concurrent Resolution No. 111 was directed to the United States Environmental Protection Agency in response to federal guidance suggesting conductivity measurement to gauge potential to violate narrative requirements. Nonetheless, the DEP's use of WVSCI to assess 47CSR2-3.2.i is consistent with the Resolution. WVSCI is an Index of Biological Integrity (IBI) for benthic macroinvertebrates. Benthic macroinvertebrates are aquatic life and afforded Clean Water Act protection. Failing WVSCI scores indicate nonsupport of the aquatic life designated use and nonattainment of the narrative criterion at 47CSR2-3.2.i. Under WVSCI, benthic macroinvertebrates are evaluated to determine the balance of the aquatic community. Multiple metrics measure species diversity, with favorable scores indicating the community "is diverse in species composition" and "the aquatic community is not composed of only pollution tolerant species." Favorable scores also demonstrate assemblages that are sufficient to perform biological functions necessary to support fish communities. The DEP has not developed or implemented a fish IBI for West Virginia waters. While a fish IBI might be useful in non-wadeable streams or other habitats that do not support the WVSCI protocol, fish community assessment is not a prerequisite or substitute for benthic macroinvertebrate assessment in habitats that support the WVSCI protocol. In fact, WVSCI assessment indicating impairment provides evidence of ecosystem imbalance and adverse impact to higher trophic level organisms.

The Legislature resolved that interpretation of narrative water quality standards is the responsibility of the DEP and that interpretation must

faithfully balance the protection of the environment and economic development. The DEP's historic and continued use of WVSCI to scientifically assess attainment of water quality standards does not violate the Legislature's statement of public policy as contained the West Virginia Water Pollution Control Act.

General and stream-specific comments were received suggesting the DEP should not use a single biological sampling event to list a stream as biologically impaired. The following streams were requested to be removed based on a single WVSCI sample: unnamed tributary (unt) of Birds Creek (WVMT-12-H-1), Hackers Creek (WVMT-26), Buffalo Creek (WVPSB-5), Parker Branch (WVO-2-Q-18-D) Maynard Branch (WVO-2-Q-23).

Given the magnitude of the DEP's responsibilities for watershed assessment, it would not be practical to demand multiple biological monitoring events at a single location prior to assessment. The design of the WVSCI allows an individual sample, qualified as comparable per its methodology, to discriminate departure from the reference condition and to be used for impairment decisions pursuant to the narrative criterion of 47CSR 2 - 3.2.i. The DEP has used this methodology to make assessment decisions on hundreds of single samples events over the last ten years in previous 303(d) lists with each list receiving the EPA approval.

The DEP does not conduct a biological assessment when suspect conditions jeopardize the validity of assessment under the WVSCI. For example, if it is known that streams have been dry for extended periods or have been scoured by a recent flood, the DEP does not perform biological monitoring. Additionally, to be considered comparable, the depth of sample areas cannot be greater than the height of the net and the flow must be sufficient to carry dislodged macroinvertebrates into the net. All biological monitoring data is extensively screened for comparability to WVSCI thresholds before it is used.

One commenter provided references to the Programmatic Environmental Impact Statement for Mountaintop Mining and Valley Fills in Appalachia (MTM/VF EIS), a supplemental study supplied by a member of the coal industry, and an academic study published after the MTM/VF EIS. The commenter contended that the referenced documents show that mountain top mining and valley fills do not cause biological impairment and therefore, the DEP's assessment of biological impairment through the use of the WVSCI is flawed. Based upon the supplemental studies, the commenter characterized the WVSCI as a "measure of change, not impairment" and opined that "a mere shift" in the biological community should not be equated to impairment because the designated use of the stream remains viable.

The following reference to the MTM/VF EIS was provided:

> ***Further, the EIS studies did not conclude that impacts documented below MTM/VF{mountaintop mining / valley fill} operations cause or contribute to significant degradation of waters of the U.S. (Programmatic Environmental Impact Statement. Corps, EPA et.al. Pg. II. D-9).***

The overwhelming majority of biological impairment listings in the 2010 West Virginia Section 303(d) List do not have associated sources identified and, in no instances, are the specific mining activities evaluated in the MTM/VF EIS identified as source of biological impairment. More importantly, the referenced statement, extracted from thousands of pages of documentation, does not wholly reflect the findings of the MTM/VF EIS. The MTM/VF EIS clearly recognizes biological impairment in certain waters downstream from evaluated mining activities, as evidenced by the following language that is contained within the same paragraph as the referenced statement:

> *Biological conditions in the streams with only valley fills represented a gradient of conditions from poor to very good; streams with valley fills and residences were most impacted. Impacts could include several stressors, such as valley fills, residences, and/or roads.*

The recognition of biological impairment is also evidenced in the

Responses to Comments section of the MTM/VF EIS:

> *Studies do indicate that aquatic communities downstream of surface coal mining operations and valley fills are impaired in some cases. Certain chemical parameters (sulfates, specific conductance, selenium) are sometimes elevated downstream of mining or valley fills. Stream reaches below mining and valley fills may have changes in substrate particle size distribution from increased fine material due to sedimentation. Some macroinvertebrate communities change in terms of diversity, population size, and pollution tolerance. However, the sample size and monitoring periods conducted for the PEIS were not considered sufficient to establish firm cause-and-effect relationships between individual pollutants and the decline in particular macroinvertebrate populations. Impairment could not be correlated with the number of fills, their size, age, or construction method. See Section II.C. Action 5 in the PEIS recognizes the value of continued evaluation of the effects of mountaintop mining operations on stream chemistry and biology.*

In regard to the supplemental studies, the MTM/VF EIS clearly indicates that the opinions and views expressed by the individual authors of referenced studies do not necessarily reflect the position or view of the agencies preparing the EIS. The DEP does not interpret the cited studies as demonstrations of universal biological integrity in streams below evaluated activities and disagrees with the commenter's characterization of the WVSCI. A "shift" in the benthic macroinvertebrate community of a stream can constitute biological impairment pursuant to 47CSR2 – 3.2.i, and the WVSCI (recognized as a "best science method" in the MTM/VF EIS) provides a sound scientific basis for assessment.

A commenter expressed the concern that "in many cases, the specific data relied upon by DWWM is inadequate and/or deficient" stating that "during metric development for the WVSCI, consideration of individual metrics did not include an evaluation of metric variability." The commenter also contends that biological impairment determinations should not be made based upon a single assessment because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment."

WVSCI variability has been measured and addressed in the listing methodology. Duplicate sampling (two samples collected at the same location and time) has been a routine component of the DEP's biological monitoring program since the initiation of WVSCI implementation. The observed variability forms the basis for a precision estimate that, in turn, creates the "gray zone" concept that is applied in the listing methodology for biological impairment. Streams with WVSCI scores falling below the true impairment threshold of 68 (5th percentile of reference) and above 60.6 (5th percentile of reference minus the precision estimate) are not initially listed but are targeted for re-evaluation. Because a gray zone WVSCI result does not provide sufficient information for classification of aquatic life use attainment, the DEP also does not interpret it as a demonstration of improved biological condition in delisting decision-making.

Temporal variability of WVSCI reference sites has also been evaluated. Multiple biological re-sampling events have been performed at reference stations. The unchanged watershed conditions and consistent WVSCI scores demonstrate acceptable variability and reproducibility of the WVSCI methodology. Conversely, WVSCI temporal variability cannot be effectively assessed in disturbed watersheds without specific knowledge of changing watershed activities that may impact biological condition. The DEP maintains that the WVSCI protocol for assessment of the 47CSR2-3.2.i criterion is scientifically sound and that the arguments presented by the commenter do not support its abandonment.

Certain comments proclaimed that the Division of Water and Waste Management is being disingenuous in its assessment of the biological integrity of state waters "in an apparent effort to inflate the list of impaired streams in West Virginia and needlessly target the mining industry."

The DEP does not agree with the above assertions. The current list reflects the DEP's responsibility under the Clean Water Act to objectively

assess use attainment in West Virginia waters. The biological assessment methodologies associated with the 2010 effort are essentially the same as those used in the preparation of 303(d) lists over the past ten years. In the very limited instances where the source of biological impairment was identified as "mining," source determinations were made through consideration of scientific information generated in TMDL development processes.

A commenter urged the DEP to seek a statutory change that would allow review of 303(d) listing decisions by the Environmental Quality Board and to develop, through rulemaking, reasonable standards for adding or removing water bodies from 303(d) lists. The commenter cited footnote 19 of the West Virginia Supreme Court of Appeals decision Monongahela Power v. Chief, Office of Water Resources, 567 S.E.2d 629, 641 (W.Va. 2002).

In the cited decision, the Supreme Court ruled that a 303(d) list developed by the DEP did not constitute an "order" pursuant to W.Va. Code § 29A-1-2(e) and is not an action that is appealable to the Environmental Quality Board under W.Va. Code § 22-11-21 (1994). The Court found that the DEP-prepared list is essentially a recommendation and has no force and effect until approved by the Administrator of the EPA, which constitutes the final disposition of the matter. The Court also rejected an argument that persons affected by the list are denied due process, finding that they are provided with the requisite notice and right to be heard. The opinion referenced Federal Clean Water Act provisions mandating that States provide public notice and opportunity for public comment on 303(d) lists prior to final submission to the EPA and case law holding that the EPA's decisions concerning 303(d) lists and Total Maximum Daily Loads are reviewable in United States district courts.

In Footnote 19, the Court noted that there is nothing in federal law which prevents authorizing the Environmental Quality Board to review DEP-prepared 303(d) lists prior to their submission to the EPA for approval and respectfully invited the attention of the Legislature to the matter. While the commenter may seek the Legislature's attention, the DEP does not intend to independently do so. As evidenced by this responsiveness summary and those included in past 303(d) lists, the DEP professionally pursues list preparation and carefully considers and addresses public comments. In their approval, the EPA must determine that the DEP properly executed all of its responsibilities under Section 303(d) of the Act, including proper consideration and response to relevant public comments. State methodologies must be consistent with federal expectations for adding and removing water bodies from the list.

Because of the applicability of federal requirements, the draft nature of list preparation by the DEP and the availability of a federal forum for review of the approved final document, the promulgation of new State rules and/or the creation of an additional State administrative review process is not believed necessary.

Recognizing the extended period of time that may elapse between 303(d) listing and TMDL development, a commenter urged the DEP to consider the inequity of more stringent point source effluent limitations that may result from 303(d) listing even though the impairment might only be resolved by increased control of nonpoint sources.

NPDES permitting rules prohibit permit issuance that would cause or contribute to a violation of water quality standards. Identification of impairment, via 303(d) listing or other mechanisms, may necessitate point sources to achieve a water quality criterion without the benefit of a mixing zone. TMDL development may allow targeting of reductions from the primary causative sources. In some TMDLs developed by the DEP, pollutant reductions are prescribed only from nonpoint sources. In other instances both point and nonpoint source reductions are determined necessary to attain criteria. There will always be some lag time between listing and TMDL development. The commenter correctly recognized that the concern is beyond the purview of those developing the 303(d) list. Nonetheless, the concern is noted.

A commenter urged the agency to enhance its written program for stream listing by creating a transparent outline of its historical listing decisions and its current listing proposal. The commenter also urged enhancement of outreach activities to include opportunity for public

review and comment prior to finalizing the proposed list.

The DEP believes that the Section 303(d) listing process already accommodates the requests. Each list prepared by the DEP includes a detailed description of the current decision methodology and supplements that provide transparency for past listing decisions and the current classification of previously listed waters. An extended public notice and comment period is provided and comments are carefully considered and addressed.

General and stream-specific comments requested streams to be removed from the 303(d) list because of the age of the samples and data used for listing. The following streams were requested to be removed because of "old data": Maynard Branch (WVO-2-Q-23), Cutright Run (WVMTB-17), Sawmill Run (WVMTB-20), Short Creek (WVO-90), Jims Branch (WVO-2-Q-18-H) Copley Trace Branch (WVO-2-Q-18-G) Parker Branch (WVO-2-Q-18-D) Indian Creek (WVM-17) Buffalo Creek (WVPSB-5).

Some of the subject biological impairment listings had assessments performed by the DEP in calendar year 2000 and were first listed on the 2002 Section 303(d) list. The ages of the assessments are recognized, but the subject impairments were promptly listed on the next Section 303(d) list after assessment results became available. New data demonstrating non-impaired conditions is not available. The EPA closely evaluates the removal of waters from the 303(d) list without TMDL development. Excluding extenuating circumstances such as a criterion change or a determination that the original listing was made in error, delisting is approvable only where new information demonstrates attainment of water quality standards. TMDL development is preceded by a comprehensive water quality and biological monitoring effort. If new monitoring indicates that a stream is not impaired, then TMDL development will not be initiated and the new data will be used to support delisting of the impairment in the next Section 303(d) List.

Commenters have asked that Dents Run (WVM-23-P), Foxgrape Run (WVMT-26-B), Rockhouse Creek (WVKC-10-T-13), Copley Trace Branch (WVO-2-Q-18-G), Left Fork of Beech Creek (WVKC-10-T-15-A), and Rollem Fork (WVO-2-Q-18-E) be delisted for biological impairment. The requests are based on WVSCI scores for the most monitoring events that fall within the gray zone (60.6 - 68.0).

Streams are neither initially listed nor delisted when their score falls within this zone. Any listed stream which has newer data within the 60.6 to 68.0 range will be retained on the list as there is no evidence that the stream is fully attaining its aquatic life use (i.e. greater than 68.0).

A commenter suggested that the biological impairments of East Fork/Twelvepole Creek (WVO-2-Q) and Kiah Creek (WVO-2-Q-18) be delisted due to the results of recent monitoring believed by the commenter to demonstrate non-impairment.

Both streams were sampled, at numerous locations, in the spring of 2009 by both the DEP and consultants working on behalf of the commenter. The streams were then sampled again by the consultant in the fall of 2009 and again by the DEP in the summer of 2010. It was determined, using all the data available to the DEP, that the streams will not be delisted in their entirety but instead shall be re-segmented.

Reevaluation of East Fork/Twelvepole Creek biological data determined an error in the draft listing for the segment below the dam. No new data is available for this segment. Consistent with the 2008 Section 303(d) list, the impaired length of this segment has been changed to "RM 4.4 to RM 10.5 (East Lynn Dam)". Additionally, the agency confirmed the draft listing for the segment upstream of the lake (RM 35 to headwaters).

Based upon new information, the DEP adjusted the impaired length of Kiah Creek from "RM 3.9 to HW" to "RM 3.9 to RM 11.8". Current biological results indicate non-impaired conditions from RM 3.9 downstream and at the most upstream station (RM 11.8). Results between the aforementioned stations indicate impairment or uncertainty and do not support delisting of this segment.

A commenter provided biological data requesting the delisting of Wet Branch (WVK-61-C).

The DEP evaluated the data and found that it could not be used. The DEP has an accepted period of time in which biological samples are collected. In order for a sample to be considered comparable in must be sampled within the WVSCI index period of April 15th to October 15th. The WVSCI data submitted by the commenter was associated with a sample collected outside of the index period.

A commenter requested that Rollem Fork (WVO-2-Q-18-E), Parker Branch (WVO-2-Q-18-D), Honey Branch (WVO-2-Q-29), Jims Branch (WVO-2-Q-18-H), Copley Trace Branch (WVO-2-Q-18-G) and Maynard Branch (WVO-2-Q-23) be reevaluated as to length of listing and propriety of listing due to existing impoundments and beaver dams.

A field investigation of Rollem Fork in 2008 confirmed the presence of the first instream pond at approximate mile point 0.9. As such, the biological impairment indicated by the benthic macroinvertebrate collection near the mouth of Rollem Fork was considered to be representative of the stream segment between the mouth and mile point 0.9. The impaired reach of Rollem Fork was revised from 1.9 miles to 0.9 miles in the 2008 Section 303(d) list.

In response to the comment, the DEP re-measured Maynard Branch, Jims Branch and Parker Branch and determined impaired lengths indicated in the Draft 2010 303(d) List to be accurate. Copley Trace Branch was re-measured and the listing was revised from "entire length" to "mouth to river mile 1.5."

The presence of impoundments in a watershed and an implication that the observed biological impairments might be caused by the impoundment rather than by pollutants in the water is taken into consideration when listing a stream. The DEP recognizes that impairments that are not caused by a pollutant need not be included on the Section 303(d) list. In the Integrated Report format, such impairments can be placed in Category 4C rather than Category 5. Applicable the EPA guidance states that waters should be listed in relation to biological assessments unless the state can demonstrate that non-pollutant stressors cause the impairment or that no pollutant(s) causes or contributes to the impairment. While the DEP accepts that the upstream habitat alteration associated with impoundments might negatively impact downstream biological scores, seldom is there sufficient information to properly discern the causative stressors at the time of assessment and listing. Uncertainty of the causative source of biological impairment at the time of assessment, as is most often the case, is not a sufficient reason to exclude the impairment from the 303(d) list. Consistent with the EPA guidance, the DEP lists waters as biologically impaired if available monitoring results fall below the WVSCI threshold. Causative stressors are identified at the front end of the TMDL development process. If the stressor identification process determines that a pollutant does not cause the impairment, then a TMDL will not be developed.

One commenter requested delisting of Frances Creek (WVO-2-Q-18-F), contending the most recent data indicates a non-impaired condition.

The most recent data available (July 2010, WVSCI score = 58.4) indicates Frances Creek is biologically impaired.

One commenter suggested the source for Jims Branch (WVO-2-Q-18-H) biological listing is habitat based not related to upstream mining activities.

The DEP recognizes that there are multiple possible sources of biological impairment and identifies sources as unknown for most initial listings. The source for Jims Branch is currently listed as "unknown" and will be evaluated when the TMDL for this watershed is developed.

A commenter asked the DEP that Wiley Branch (WVO-2-Q-28) be removed from the 2010 Draft 303(d) list for biological impairment based on biological data from Fall 2009 submitted by the commenter.

The impairment was not previously listed and the most current qualifying

biological data (July 2010, WVSCI score = 64.7) falls within the gray zone and does not support a new listing. As such, the proposed listing has been removed.

A commenter requested delisting of biological impairments for Honey Branch (WVO-2-Q-29) and Right Fork/Cub Branch (WVO-2-Q-31-A) based on new data from samples collected in October 2009 and April 2010.

The DEP re-sampled Honey Branch and Right Fork/Cub Branch in July 2010 and resultant WVSCI scores (55.9 and 53.0, respectively) do not support delisting.

A commenter requested delisting of biological impairments for Indian Creek (WVM-17), Dents Run (WVM-23-P) and Sawmill Run (WVMTB-20) citing issues of representativeness of samples.

The DEP reviewed the sample information and determined the samples were comparable per the WVSCI methodology. The listings have been retained.

A commenter asked that Vance Branch (WVO-2-Q-18-C-1) be removed from the Draft list as the entire length of stream had received a Section 404 permit for its filling.

The DEP verified the existence of a permit to fill the stream and determined filling of the stream had taken place. The remaining section of stream does not contain suitable sample area to support the WVSCI protocol, therefore the small remaining portion of Vance Branch has been removed.

One commenter requested that the iron impairment of Indian Creek (WVM-17) be delisted.

The DEP has reviewed Division of Mining and Reclamation trend data for iron in Indian Creek and found one violation out of 51 samples in the past three plus years (2% rate of exceedance). Based on this data, the iron impairment was removed.

A comment was received requesting delisting of the biological impairment for Short Creek (WVO-90), stating the age of data used for listing and the number of samples were insufficient. The commenter also mentioned a more recent biological result (WVSCI score = 60.4 at mile point 3.4). Additionally, the commenter wanted the source of the Short Creek impairment changed from "mining" to "undetermined."

The WVSCI scores observed in 2005 clearly indicate biological impairment from the mouth through mile point 7.6. At that location, the observed WVSCI score of 61.3 falls within the 'gray zone.' As described previously, gray zone scores represent uncertain biological conditions and are not evidence of an acceptable condition. As per the listing methodology, the entire length of the stream will remain listed. The recent biological score of 60.4 does not contradict the assessment.

The 2005 monitoring of Short Creek and its tributaries was a component of pre-TMDL monitoring for the Upper Ohio South Watershed TMDL development project. Within that project, the biological stressor identification process determined ionic stress as a significant stressor of Short Creek. TMDL development for the biological impairment was deferred. Since a TMDL has not been developed for the biological impairment of Short Creek, it must remain on the 303(d) list. The EPA has directed the DEP to consider the results of stressor identification in identifying sources associated with 303(d) listings. In this instance, the sources of ionic stress are active and/or historical mining activities.

A commenter questioned the iron impairment for Paint Creek (WVK-65) based upon trout water criteria.

After consultation with the DNR, the DEP has determined Paint Creek to be a trout water for the section between Burnwell (RM 13.24) and Pax (RM 31.48). This is consistent with the segment identified as trout water in the 2001 Paint Creek TMDL. In the 2010 Draft 303(d) List, the DEP mistakenly identified the section above Pax as trout water and has corrected the listing.

Several commenters submitted data and/or WVSCI scores requesting reevaluation of the biological impairment listings of Pine Creek (WVOG-65-H), Right Fork of Pine Creek (WVOG-65-H-1), Cow Creek (WVOG-65-J), Rockhouse Creek (WVKC-10-T-13), and Left Fork of Beech Creek (WVKC-10-T-15-A).

The DEP requires basic information (i.e. location, methods, etc) be supplied with data in order for it to be qualified and evaluated. These submissions did not contain the necessary information; therefore, the DEP did not accept the data for evaluation.

A commenter requested changing the biological impairment listing for Spruce Fork (WVKC-10-T) from "entire length" to "mouth to river mile 13." The commenter provided a WVSCI score of 67.1 at river mile 13.

A WVSCI score that falls within the gray zone (60.6 to 68.0) does not indicate a non-impaired condition. Also, the submitted data did not meet the necessary qualifications. As such, Spruce Fork will remain on the 303(d) list for its entire length.

List Format Description

The format of the 2010 Section 303(d) list is organized around the Watershed Management Framework. The five hydrologic groups (A-E) of the framework provide the skeleton. Within each hydrologic group, watersheds are arranged alphabetically and impaired waters are sorted by stream code in their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criterion, the affected designated use, the general cause of the impairment (where known), the impaired length (or, by default, the entire length), the planned or last possible timing of TMDL development and whether or not the impairment was on the 2008 list. The cause of impairment is often unknown or uncertain at the time of listing and is so indicated on the list. The scheduling of TMDL development is discussed in detail in the Total Maximum Daily Load Process section. A West Virginia Watershed Management Framework map on page 6 is provided to assist navigation within the list. A key is also provided to aid in the interpretation of presented information.

List Supplements Overview

Seven supplements are provided that contain additional information. The seven supplements are entitled: "Previously Listed Waters – No TMDL Developed," "Previously Listed Waters – TMDL Developed," "Impaired Waters under TMDL Development," "Water Quality Improvements Being Implemented – Below Listing Criteria," "Impaired Waters – No TMDL Needed," "Total Aluminum TMDLs Developed," "Supplemental Table E - Manganese TMDLs" and "New Listings for 2010."

Supplemental Table A - Previously Listed Waters – No TMDL Developed

Previously listed waters from the 2008 list that are not on the 2010 list are included in this supplement if a TMDL has not been developed, and these waters have been reevaluated and determined not to be impaired. Causes for revision of the impairment status include recent water quality data demonstrating an improved water quality condition, revision to the water quality criteria associated with the previous listing, documentation that the water was previously listed in error or a modification of the listing methodology.

Supplemental Table B - Previously Listed Waters - TMDL Developed

TMDLs have been developed for many previously listed waters. TMDL development allows the removal of an impaired water from the 303(d) list. In the suggested format of the Integrated Report, such waters are to be classified in Category 4A and clearly distinguished from Category 5 and the 303(d) list. Waters included in Category 4A have TMDLs developed, but water quality improvements are not yet complete and/or documented. The waters identified in Supplement B will match those of Category 4A of the Integrated Report.

Supplemental Table C - Water Quality Improvements

The goal of TMDLs and stream restoration projects is to bring the stream back to the point where it meets its designated uses and the associated water quality criteria. Supplement C includes a listing of streams with improved water quality due to TMDL implementation or pre-TMDL stream restoration work resulting in delisting. In the Integrated Report, the waters in Supplement C are to be included in Category 1 (meeting all uses), provided that impairments for other uses/pollutants are not evidenced.

Supplemental Table D - Impaired Waters - No TMDL Development Needed

This table lists impaired waters for which either other control mechanisms are in place to control pollutants or the water is not impaired by a pollutant (i.e., flow alterations caused by mining). These are the same waters contained in the Integrated Report's Category 4b and 4c, respectively.

Supplemental Table E - Total Aluminum TMDLs Developed

This table contains a list of previously listed waters for total aluminum TMDL that were developed and established by the EPA. Due to a criteria change from total aluminum to dissolved aluminum, the state placed total aluminum TMDLs onto a separate table from Supplemental Table B.

Supplemental Table E - Manganese TMDLs Developed

Manganese TMDLs identify waters which had TMDLs developed based upon water quality criteria that is no longer effective. After the subject TMDLs were developed, EPA approved revisions to West Virginia water quality standards that restricted the applicability of the manganese criterion to five mile zones upstream of known water supply intakes. The table is included to document the development of the obsolete TMDLs and to distinguish them from the effective TMDLs identified in Supplemental Table B.

Supplemental Table F - New Listings for 2010

This table is a list of impaired waters that were not previously included on the 2008 Section 303(d) list.

Louis Reynolds/R3/USEPA/US

12/20/2010 07:52 AM

To: Stefania Shamet

cc: Carrie Traver, John Forren, Margaret Passmore, Palmer Hough

bcc:

Subject: Re: ACK!!!!!!!!!!! Golden algae and Spruce

I didn't bother looking on the connector to see if this is there, I figured I would just send it along. Is this the only one that is missing?

PparvumGrowthRate_FinalReport.pdf

- Hambright 2010 was omitted from the reference list. The reference is: **Hambright, K. D. (2010)** *Prymnesium parvum Growth studies using the Dunkard Creek isolate (WANA strain).* Report submitted to: West Virginia Department of Environmental Protection Division of Water and Waste Management. Charleston, WV. Department of Zoology University of Oklahoma, Norman, OK.

Lou Reynolds
USEPA Region III
Freshwater Biology Team
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P 304-234-0244
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Stefania Shamet | Thanks Carrie! Just to be safe, let's square the... | 12/17/2010 02:16:37 PM

From: Stefania Shamet/R3/USEPA/US
To: Carrie Traver/R3/USEPA/US@EPA
Cc: John Forren/R3/USEPA/US@EPA, Louis Reynolds/R3/USEPA/US@EPA, Margaret Passmore/R3/USEPA/US@EPA, Palmer Hough/DC/USEPA/US@EPA
Date: 12/17/2010 02:16 PM
Subject: Re: ACK!!!!!!!!!!! Golden algae and Spruce

Thanks Carrie! Just to be safe, let's square the circle with Lou on Monday and make sure we've accounted for all the data/studies he used for the golden algae discussion. That one will be important. Thanks again and have a great weekend!

Carrie Traver | Stef, The Hambright reference was on the list of... | 12/17/2010 02:09:36 PM

From: Carrie Traver/R3/USEPA/US
To: Stefania Shamet/R3/USEPA/US@EPA
Cc: John Forren/R3/USEPA/US@EPA, Louis Reynolds/R3/USEPA/US@EPA, Margaret Passmore/R3/USEPA/US@EPA, Palmer Hough/DC/USEPA/US@EPA
Date: 12/17/2010 02:09 PM
Subject: Re: ACK!!!!!!!!!!! Golden algae and Spruce

Stef,

The Hambright reference was on the list of corrections/additions I sent to Marcel, Chris Hunter, etc. this week. (I'm attaching a copy below.) We do also have a pdf of the study on the ESC.

[attachment "Reference additions.doc" deleted by Stefania Shamet/R3/USEPA/US]
Carrie Traver
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Stefania Shamet	Somehow, the studies that Lou relies on for our...	12/17/2010 01:05:03 PM

From:	Stefania Shamet/R3/USEPA/US
To:	Carrie Traver/R3/USEPA/US@EPA, Margaret Passmore/R3/USEPA/US@EPA, Louis Reynolds/R3/USEPA/US@EPA
Cc:	John Forren/R3/USEPA/US@EPA, Palmer Hough/DC/USEPA/US@EPA
Date:	12/17/2010 01:05 PM
Subject:	ACK!!!!!!!!!!! Golden algae and Spruce

Somehow, the studies that Lou relies on for our conclusions about golden algae did not make it into the RD or Appendix 5. I figured this out when Lou sent me an email referencing growth studies by Hambright, and when I went to get the full citation I couldn't find it in Appendix 5.

Lou -- Can you PLEASE give us a list of the studies you are relying on and get it to Carrie Traver ASAP!

Carrie -- there are WAY too many balls in the air -- once you get these -- please jump up and down (by email and cc me) to make sure HQ gets these in? These are crucial.

Thanks.

Prymnesium parvum Growth Studies Using the Dunkard Creek Isolate (WANA Strain)

Report submitted to:
West Virginia Department of Environmental Protection
Division of Water and Waste Management
Charleston, WV

K. David Hambright
Plankton Ecology Laboratory
Biological Station
and
Program in Ecology and Evolutionary Biology
Department of Zoology
University of Oklahoma, Norman, OK

7 October 2010 (amended 25 Oct 2010)

Prymnesium parvum Growth Studies Using the Dunkard Creek Isolate (WANA Strain)

Introduction

The golden alga *Prymnesium parum* bloomed in Dunkard Creek (WV-PA) in September and October 2009 resulting in devastating fish, mussel, and salamander kills over a 30 mile stretch of the stream. Preliminary investigations led to the hypothesis that increased salinities resulting from high saline discharges by local mining activity were conducive to the bloom. Study with strains of *P. parvum* isolated from Texas and Oklahoma, in waters of relatively high salinities, suggest that *P. parvum* growth rates are depressed at lower salinities. It is further hypothesized growth rates of the Dunkard Creek strain of *P. parvum* might also be reduced at lower salinities. If so, a possible management action aimed at Dunkard Creek salinity reduction is warranted. The purpose of this study was to analyze growth rates of the Dunkard Creek *P. parvum* strain at different salinities.

Methods

The strain of *P. parvum* that was found in the Dunkard Creek Watershed and identified as the proximate cause of fish and other aquatic life kills in September and October 2009 was used to establish laboratory cultures at University of Oklahoma Biological Station (UOBS). Water from Dunkard Creek was shipped to UOBS for establishment of non-axenic cultures in modified COMBO medium (Kilham et al. 1998) with high salinity (6 or 15 g Instant Ocean L^{-1}; equivalent to ~10,000 and 23,000 $\mu S\ cm^{-1}$, respectively) and high nutrients (800 and 50 µ moles L^{-1} N and P). Cultures used in experiments reported here (WANA 576 and WANA 578; different cell lineages isolated from the original water sample) were >99% pure, with unidentified green unicells and diatoms present in extremely low abundances.

We performed two replicate 6-day experiments (experiments 1 and 2) and one 14-day experiment (experiment 3) to track golden algae growth rates (absolute and relative to other Dunkard Creek algae present in cultures) across gradients of salinity. In experiments 1 and 2, salinity treatments were created to mimic the 4:1 sulfate and chloride concentrations in Dunkard Creek water in the area of the coal mine discharge (2 g sulfate, as calcium sulfate, and 0.5 g chloride, as sodium chloride, L^{-1}; i.e., full-strength or 1× mine pool water) and multiple dilutions of full-strength mine discharge water (i.e., at 0.5×, 0.25×, 0.125×, 0.06×, and 0× mine pool water). All salinity treatments were replicated 5 times. Experiments were conducted in 250- (experiment 1) and 125-mL (experiment 2) Erlenmeyer flasks at room temperature and on a 12-hr light:12-hr dark schedule. Following inoculation of experimental flasks, golden algal densities were tracked using flow cytometry-based enumeration of cell densities initially and every second day. Both experiments were terminated after 6 days due to high incidence of contamination in experimental cultures. Experiment 3 was set up in a similar manner, but using Instant Ocean to establish the salinity gradient (0, 2, 4, 6, 10, and 15 g Instant Ocean L^{-1}, three replicates each) and was run for 14 days to measure both, initial growth rates of golden algae, but also to quantify golden algae's growth response to different salinities relative to other algae in the cultures.

Experiment 1 was initiated from a WANA 576 culture containing 7,600 cells mL^{-1}, by adding 30-mL aliquots to 1-L flasks containing COMBO, 80 µ mole N and 5 µ mole P L^{-1}, and variable salinities. Each liter was then divided evenly among five 250-mL Erlenmeyer flasks, 150 mL each, with starting densities of golden algae ~228 cells mL^{-1} in each flask. Experiment 2 was initiated from a WANA 576 culture containing 10,800 cells mL^{-1}, by adding 15-mL aliquots to 500-mL flasks containing COMBO and variable salinities as above. Each liter was then divided evenly among five 125-mL Erlenmeyer flasks, 75 mL each, with starting densities of golden algae ~324 cells mL^{-1} in each flask. Experiment 3 was initiated from WANA 578 culture containing 2,020,000 cells mL^{-1}, by adding 3.5-mL aliquots to 500-mL flasks containing COMBO, 80 μ mole N and 5 μ mole P L^{-1}, and variable salinities. Starting densities of golden algae in each flask were ~15,000 cells mL^{-1}.

Salinity for each sample was measured as conductivity (Hach HQ40d meter) at 22.4 C and recorded in μS cm^{-1}. pH was measured using a Fisher Accumet pH Meter Model 915. Flasks were swirled daily. Initially, and every second day, a 500 μL sample was analyzed on a BD FACSCaliber flow cytometer to determine golden algal cell densities. For Experiment 3, densities of contaminant algae were also recorded. Additional samples from all experiments were preserved in Lugol's solution and used to verify flow cytometer counts.

In all sulfate-chloride salinity treatments of experiments 1 and 2, the sudden change in culture medium from COMBO with Instant Ocean to COMBO with sulfates and chlorides only as the source of salts resulted in high mortality of golden algae (mean = 37%). Similar initial mortality, or shock, has been observed previously when transferring golden algae to new culture medium conditions. After two days, all cultures had recovered and were growing well, except the highest sulfate-chloride treatments, which are not considered in the analyses below. Maximum growth rates in each treatment were calculated as the slope of the exponential regression of cell density and time (Fig. 1). Maximum growth rates of *P. parvum* in experiment 3 were calculated using data from day 0 to day 7.

Results

Both experiments 1 and 2 revealed similar responses of WANA 576 to changes in salinities using sulfates and chlorides and have been combined for analysis. Growth rates of *P. parvum* between day 2 and day 6 were positive, but declined with declining salinities, especially below 1000 μS cm^{-1} (Fig. 2). Experiments were terminated after day 6 because of relatively high contamination (data not shown). Experiment 3 revealed that the decline in *P. parvum* growth rates with declining salinity, as well as the high level of contamination over time was not an artifact of using sulfate and chloride as sources of salinity in the cultures. Growth rates in the lowest salinity treatment were more than 50% lower than in the highest salinity treatment (Fig. 3). Although all treatments were eventually highly contaminated over time, the level of contamination increased with decreasing salinity (Fig. 4). The contaminants, a small diatom and unidentified green unicell (~4 μm diameter), both presumably from the original Dunkard Creek water and present in all cultures at extremely low abundances, had highest growth rates in low salinity treatments and declining growth rates with increasing salinity (Fig. 5).

Discussion and Conclusions

All experiments revealed a relatively strong relationship between *P. parvum* and culture salinities. Patterns observed for isolates from Dunkard Creek were similar to patterns observed previously in other *P. parvum* isolates (Baker et al. 2007). In general, positive growth rates can be maintained by *P. parvum* across a broad range of salinities (note that Expt 3 salinities covered a much greater range of salinities – up to 15 g L^{-1} Instant Ocean, maximum conductivities >20,000 μS cm^{-1}), but growth rates are substantially lower at salinities equivalent to those observed in most fresh waters (i.e., < 1000 μS cm^{-1}). Moreover, our experiments revealed that not only are *P. parvum* growth rates reduced at lower salinities, but that growth rates of other, presumably native, algae are enhanced at lower salinities. Thus reduced salinities shift the competitive edge from *P. parvum* to other algae.

Reasons behind the lack of *P. parvum* growth in the highest sulfate-chloride treatment are not known. The maximum conductivity obtained with the addition of 2 g of sulfate and 0.5 g of chloride was 4,275 μS cm^{-1}, although the actual amount of sulfate in solution was less than 100%. Compared with Instant Ocean, our standard salinity source of *P. parvum* cultures, this amount of sulfate is high. At 6.6% sulfate by weight, our highest salinity cultures (i.e., 15 g Instant Ocean L^{-1}) contain 1.0 g sulfate L^{-1}, or half the amount added in the high treatments of experiments 1 and 2. Studies have shown that high sulfates can interfere with nitrogenases in phytoplankton, particularly those associated with nitrogen fixation in cyanobacteria (Marino et al. 1990). But it is also possible that other nitrogenases, such as those used in nitrate assimilation, might also be negatively affected.

High calcium concentrations could be another factor involved with lack of *P. parvum* growth in the high sulfate-chloride treatments and overall low growth rates in all sulfate-chloride treatments (experiments 1 and 2) relative to Instant Ocean treatments (experiment 3) (c.f. Figs. 2 and 3). Sulfates were added as calcium sulfate, in which there is 466 mg of calcium for every 1 g of sulfate. Instant Ocean contains only 1.02% calcium by weight. Thus a 15 g Instant Ocean L^{-1} culture contains only 153 mg calcium L^{-1}. Studies have demonstrated that calcium ions can act as cofactors to *P. parvum* toxins, increasing their toxicity substantially (Shilo 1981). As such, it is conceivable that our use of calcium sulfate inadvertently created conditions of higher toxicity, which may have negatively affected growth or increased mortality via self-toxicity (Olli and Trunov 2007).

Nevertheless, further research could add substantially to our understanding of specific factors involved in the 2009 Dunkard Creek *P. parvum* bloom. In particular, it is recommended that further monitoring and analysis of the chemical composition of the mine water discharges be conducted in order to enhance understanding of the roles of high sulfates and other ions in *P. parvum* population growth and toxicity. Further experimentation also will be required to confidently assess the relative roles of sulfates, calcium, or other ions, in *P. parvum* growth and toxicity in general, but also with respect to the potential for future Dunkard Creek *P. parvum* blooms. While our experiments were conducted in the laboratory with artificially nutrient replete culture media, and there remains uncertainty with respect to sulfates and calcium as described above, our results corroborate the general understanding of *P. parvum* populations, blooms, and fish kills globally – high nutrients and high salinities are major requisites for *P. parvum* domination of algal communities, and especially for *P. parvum* blooms.

Acknowledgments
Algal cultures are maintained by James Easton and Anne Easton. All experiments were performed by Karen Glenn, James Easton, Ann Morris, and Anne Easton. Karen Glenn and Rich Zamor read and commented on earlier drafts of this report. Funding was provided by the West Virginia Department of Environmental Protection.

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Marino, R., R. W. Howarth, J. Shamess, and E. Prepas. 1990. Molybdenum and sulfate as controls on the abundance of nitrogen-fixing cyanobacteria in saline lakes in Alberta. Limnol. Oceanogr. **35**: 245-259.

Olli, K., and K. Trunov. 2007. Self-toxicity of *Prymnesium parvum* (Prymnesiophyceae). Phycologia 46: 109-112.

Shilo, M. 1981. The toxic principles of *Prymnesium parvum*, p. 37-47. In W. W. Carmichael [ed.], The water environment: algal toxins and health. Plenum Press.

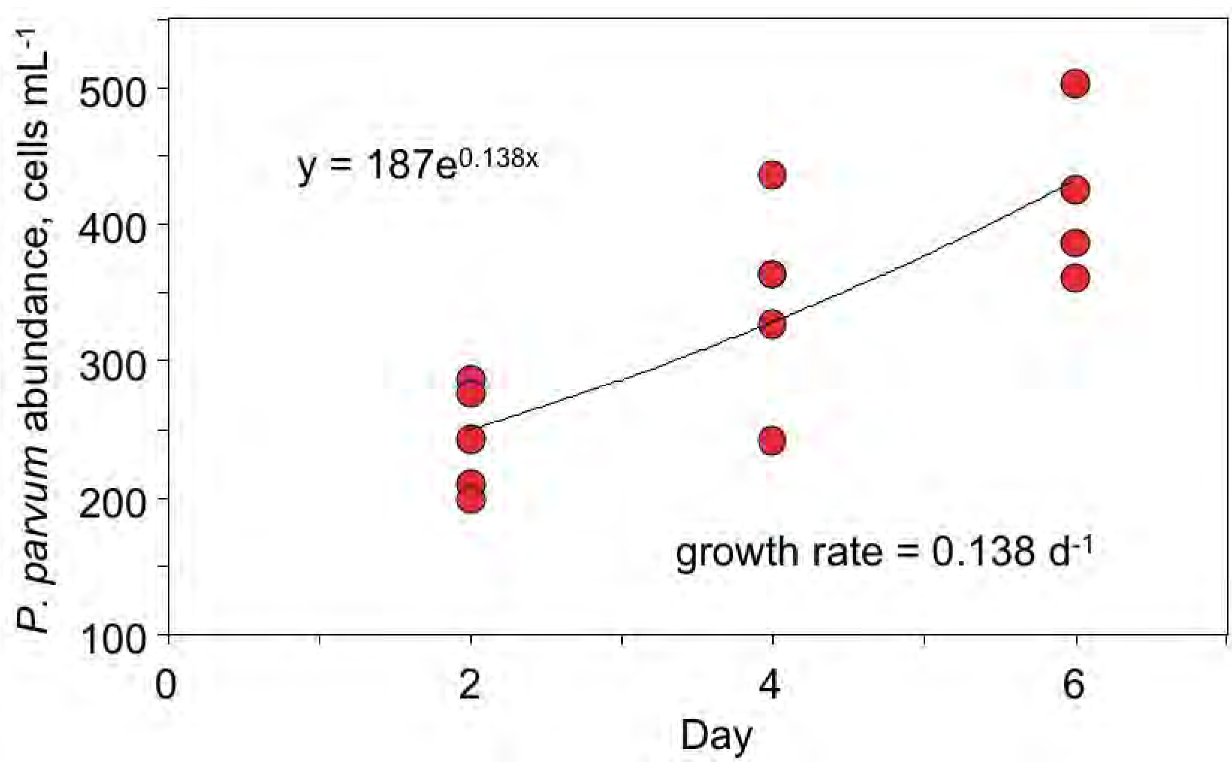

Figure 1. Representative example of growth rate calculation. Points represent *P. parvum* cell densities in experimental flasks (in this case, the 0× treatment of experiment 1) on days 2, 4, and 6. The slope (i.e., the exponent) of an exponential regression through these points is a measure of the instantaneous growth rate in units of per day.

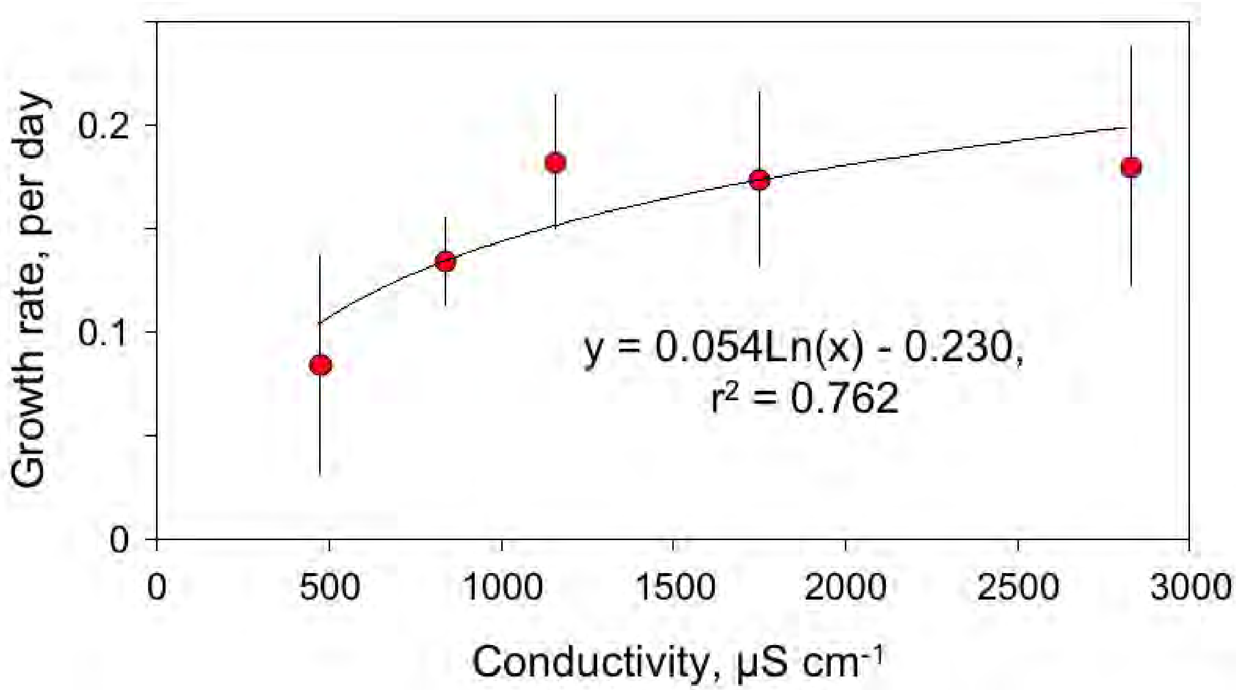

Figure 2. Growth rate of *P. parvum* as a function of sulfate and chloride concentrations (here indicated by conductivity (µS cm^{-1}). Treatments, each replicated 5-fold per experiment and from highest to lowest conductivity, are 1000 mg sulfate and 250 mg chloride, 500 mg sulfate and 125 mg chloride, 250 mg sulfate and 62.5 mg chloride, 125 mg sulfate and 31.3 mg chloride, and 0 mg sulfate and 0 mg chloride. Points represent mean (±SE) values generated separately from experiments 1 and 2 using *P. parvum* cell densities from day 2 to day 6. The highest salinity treatment (2000 mg sulfate and 1000 mg chloride, ~4,082 µS cm^{-1}) was not conducive to *P. parvum* growth and has been omitted here.

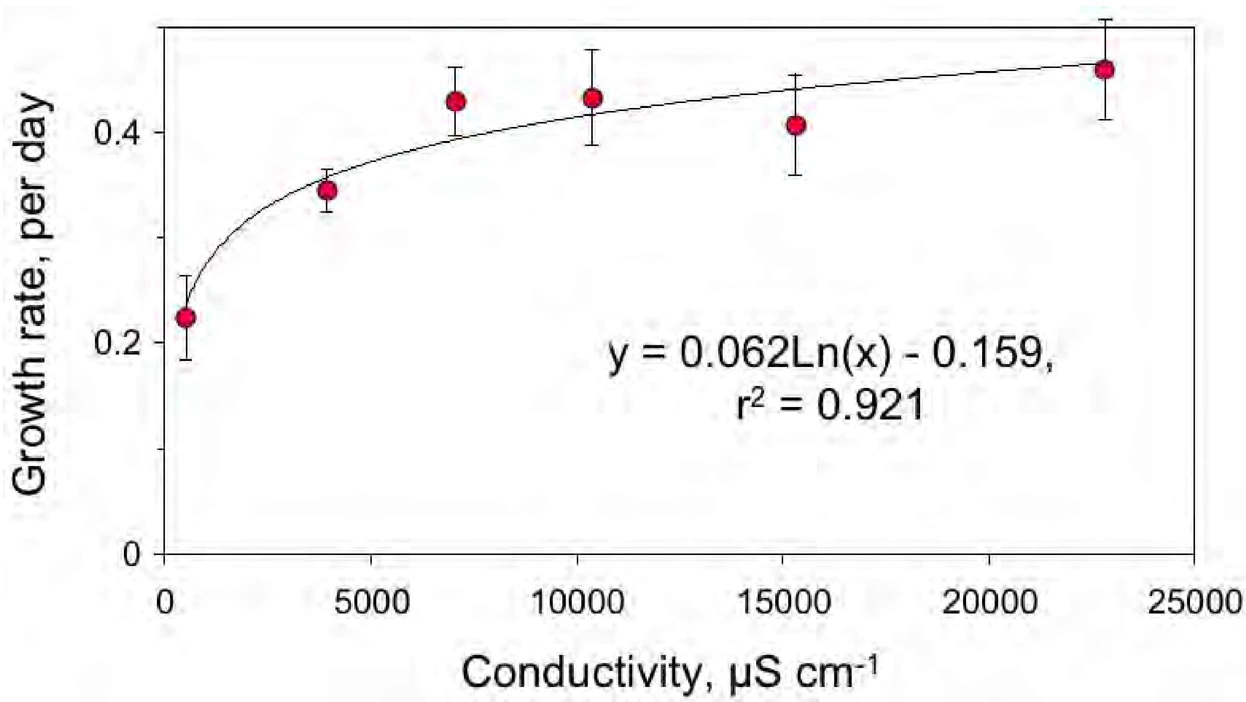

Figure 3. Growth rate of *P. parvum* as a function of Instant Ocean concentrations (here indicated by conductivity (µS cm^{-1}). Treatments, from highest to lowest conductivity, are 15, 10, 6, 4, 2, and 0 g Instant Ocean L^{-1}. Points represent mean (±SE) values generated from day 0 to day 7 growth of *P. parvum* in each treatment from Experiment 3.

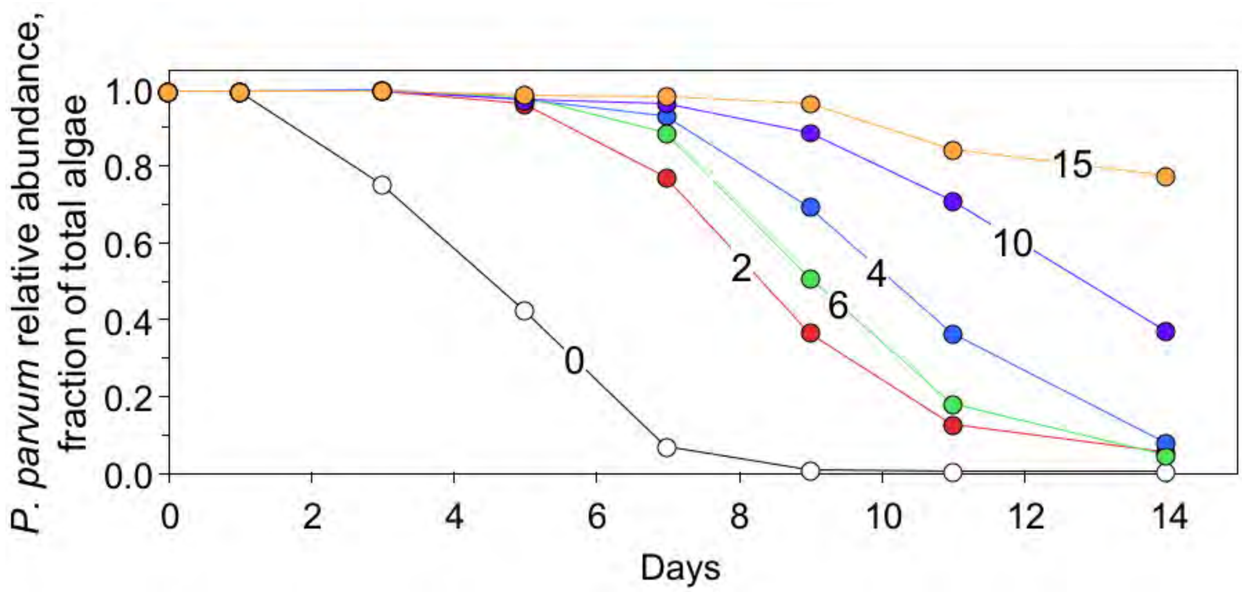

Figure 4. Relative abundance of *P. parvum* (fraction of total algae) in salinity treatments over time in experiment 3. Treatments (i.e., g Instant Ocean L^{-1}) are indicated.

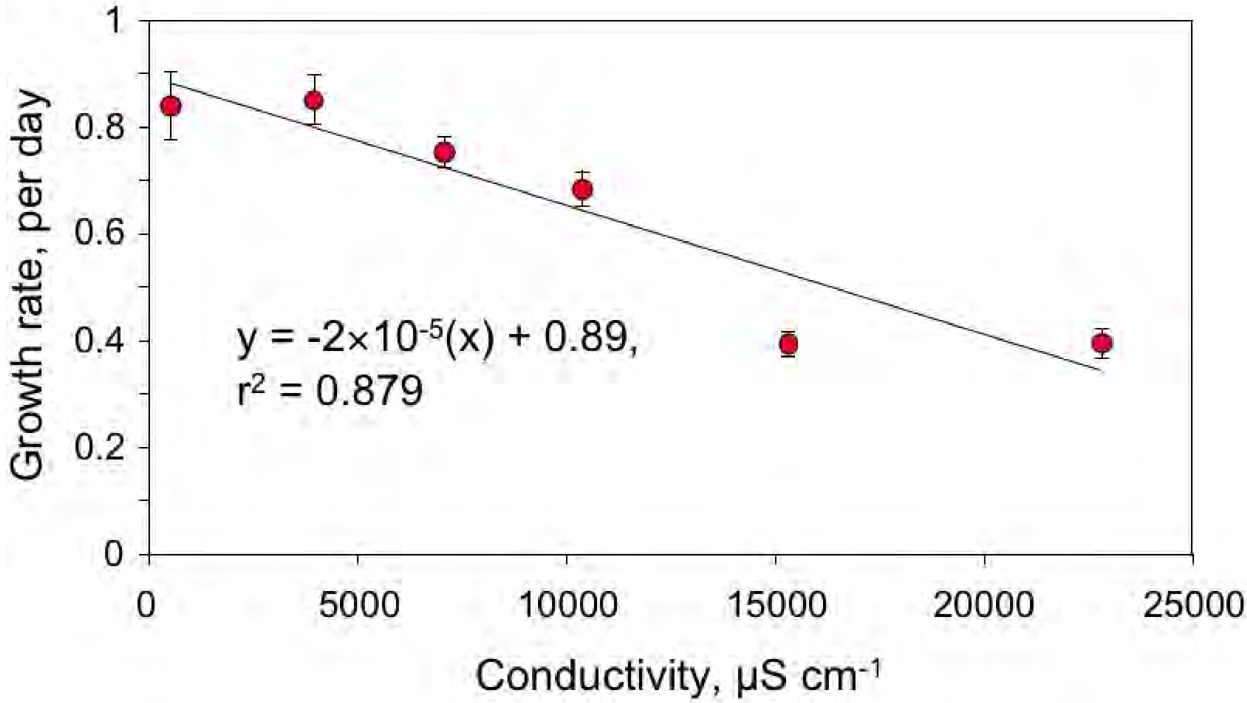

Figure 5. Growth rate of contaminant algae (small unidentified diatom and green unicell) in experiment 3 as a function of Instant Ocean concentrations (here indicated by conductivity (μS cm^{-1}). Rates were calculated from cell densities in days 3 through 14.

ESC@EPA
12/20/2010 10:45 AM

To Gwen Arnold, Frank Borsuk, Kristopher DeNardi, Mark Douglas, Michael Dunn, John Forren, Jennifer Fulton, Gregory Gies, Joy Gillespie, Nancy Grundahl, Palmer Hough, Bill Jenkins, Jeffrey Lapp, Matthew Lee, Michael Mansolino, Christine Mazzarella, Richard Paiste, Margaret Passmore, Regina Poeske, Greg Pond, Louis Reynolds, Charles Rhodes, Stefania Shamet, Carrie Traver

cc

bcc

Subject ESC Project Update: Spruce Mine Data and References/ New resources added by David Rider

Spruce Mine Data and References - Environmental Science Connector Update
David Rider has added the following resources to the Spruce Mine Data and References project.

- Selenium Letter

The resources were added in the Spruce Mine Data and References \ References PDFs folder.

Review Spruce Mine Data and References project

The search feature can be used to quickly locate these resources by searching on title or today's date.

If you do not wish to receive email notifications for this project, please go to the ESC My Profile Page to change your notification preferences.

Environmental Science Connector • http://portal.epa.gov/ESC

Ross Geredien/DC/USEPA/US

12/22/2010 10:47 AM

To Christopher Hunter

cc Julia McCarthy, Marcel Tchaou

bcc

Subject Re: Next set of tasks - Spruce Appendices

Chris, another quick question, this one on Section: are we just keeping it to simple sections: A2.1., A2.2., A2.3., etc. and NOT A2.1.1. or A2.3.1.2.? Should we eliminate these latter subsections and renumber them accordingly?

Thanks.

Ross Geredien
ORISE Fellow
EPA Office of Wetlands, Oceans, and Watersheds
202-566-1466
Geredien.ross(AT)epa.gov

Christopher Hunter I've uploaded the revised appendices on to the... 12/22/2010 09:17:41 AM

From: Christopher Hunter/DC/USEPA/US
To: Marcel Tchaou/DC/USEPA/US@EPA, Julia McCarthy/R8/USEPA/US@EPA, Ross Geredien/DC/USEPA/US@EPA
Date: 12/22/2010 09:17 AM
Subject: Next set of tasks - Spruce Appendices

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G:\Wetlands Division\WARRB\Program Ops Team\Coal_MTM-VF\Permits\Arch Coal - Spruce No.1\FD\Appendices

Julia - Macroinvertebrates & Cumulative Effects
Marcel - Selenium
Ross - Water Quality & Wildlife
Me - Mitigation

Please save on the G in redline,
Thanks

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

Ross Geredien/DC/USEPA/US	To	Julia McCarthy
12/22/2010 11:07 AM	cc	Christopher Hunter, Marcel Tchaou
	bcc	
	Subject	Re: Next set of tasks - Spruce Appendices

Agreed. That is my preferred format, too. Any feedback on my other questions?

Ross Geredien
ORISE Fellow
EPA Office of Wetlands, Oceans, and Watersheds
202-566-1466
Geredien.ross(AT)epa.gov

Julia McCarthy	I just spoke with Marcel and he wants us to form...	12/22/2010 10:57:15 AM

From: Julia McCarthy/R8/USEPA/US
To: Christopher Hunter/DC/USEPA/US@EPA
Cc: Marcel Tchaou/DC/USEPA/US@EPA, Ross Geredien/DC/USEPA/US@EPA
Date: 12/22/2010 10:57 AM
Subject: Re: Next set of tasks - Spruce Appendices

I just spoke with Marcel and he wants us to format all citations the same way. The way it was decided is: for a single reference (Author Date) and for multiple (Author Date, Author Date, Author Date). This is in contrast to (Author, Date) or (Author, Date; Author, Date).
Cheers,
Julia

Julia McCarthy
on detail to USEPA Headquarters
Office of Wetlands, Oceans and Watersheds
(202) 566-1660
mccarthy.julia@epa.gov

A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a connection of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity. ~Aldo Leopold

Christopher Hunter	I've uploaded the revised appendices on to the...	12/22/2010 09:17:42 AM

From: Christopher Hunter/DC/USEPA/US
To: Marcel Tchaou/DC/USEPA/US@EPA, Julia McCarthy/R8/USEPA/US@EPA, Ross Geredien/DC/USEPA/US@EPA
Date: 12/22/2010 09:17 AM
Subject: Next set of tasks - Spruce Appendices

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Julia - Macroinvertebrates & Cumulative Effects
Marcel - Selenium
Ross - Water Quality & Wildlife
Me - Mitigation

Please save on the G in redline,
Thanks

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

Gregory Peck/DC/USEPA/US
12/22/2010 12:15 PM

To kevin.minoli
cc
bcc
Subject TP's for 1pm on Spruce

(b) (5) [redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]

[redacted]

- [redacted]
- [redacted]

(b) (5) [redacted]

[redacted]

Christopher Hunter/DC/USEPA/US

12/22/2010 12:25 PM

To Ross Geredien

cc

bcc

Subject Re: Next set of tasks - Spruce Appendices

I was thinking 402 would be able to help with that question. Can you call Sharmin Syed, Scott (JS) Wilson, or Marcus Zobrist and see if they can clear that up?

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

Ross Geredien	Chris, the one comment that remains in the WQ...	12/22/2010 12:20:28 PM

From: Ross Geredien/DC/USEPA/US
To: Christopher Hunter/DC/USEPA/US@EPA
Date: 12/22/2010 12:20 PM
Subject: Re: Next set of tasks - Spruce Appendices

Chris, the one comment that remains in the WQ and wildlife appendix is whether WV Selenium water quality is a "standard" or a "criterion"? Do we know?

Ross Geredien
ORISE Fellow
EPA Office of Wetlands, Oceans, and Watersheds
202-566-1466
Geredien.ross(AT)epa.gov

Christopher Hunter	Let's say by the time everyone leaves for the ho...	12/22/2010 11:30:32 AM

From: Christopher Hunter/DC/USEPA/US
To: Ross Geredien/DC/USEPA/US@EPA
Cc: Julia McCarthy/R8/USEPA/US@EPA, Marcel Tchaou/DC/USEPA/US@EPA
Date: 12/22/2010 11:30 AM
Subject: Re: Next set of tasks - Spruce Appendices

Let's say by the time everyone leaves for the holiday, I'm hoping that it won't be that much work.

The references are in the G:\Wetlands Division\WARRB\Program Ops Team\Coal_MTM-VF\Permits\Arch Coal - Spruce No.1\FD\WorkingFiles directory, titled Appendix 5 final Marcel version 12-21-2010.doc

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

Ross Geredien	Will do, Chris. Two quick questions, when do yo...	12/22/2010 10:30:23 AM

From:	Ross Geredien/DC/USEPA/US
To:	Christopher Hunter/DC/USEPA/US@EPA
Cc:	Julia McCarthy/R8/USEPA/US@EPA, Marcel Tchaou/DC/USEPA/US@EPA
Date:	12/22/2010 10:30 AM
Subject:	Re: Next set of tasks - Spruce Appendices

Will do, Chris. Two quick questions, when do you want this by, and where is the most current version of the References Appendix?

Ross

Ross Geredien
ORISE Fellow
EPA Office of Wetlands, Oceans, and Watersheds
202-566-1466
Geredien.ross(AT)epa.gov

Christopher Hunter I've uploaded the revised appendices on to the... 12/22/2010 09:17:41 AM

From:	Christopher Hunter/DC/USEPA/US
To:	Marcel Tchaou/DC/USEPA/US@EPA, Julia McCarthy/R8/USEPA/US@EPA, Ross Geredien/DC/USEPA/US@EPA
Date:	12/22/2010 09:17 AM
Subject:	Next set of tasks - Spruce Appendices

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Marcel - Selenium
Ross - Water Quality & Wildlife
Me - Mitigation

Please save on the G in redline,
Thanks

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

Ross Geredien/DC/USEPA/US

12/22/2010 12:57 PM

To Christopher Hunter

cc Julia McCarthy, Marcel Tchaou

bcc

Subject Re: Next set of tasks - Spruce Appendices

Could we move this in with the other Appendices?

Ross Geredien
ORISE Fellow
EPA Office of Wetlands, Oceans, and Watersheds
202-566-1466
Geredien.ross(AT)epa.gov

Christopher Hunter	Let's say by the time everyone leaves for the ho...	12/22/2010 11:30:32 AM

From: Christopher Hunter/DC/USEPA/US
To: Ross Geredien/DC/USEPA/US@EPA
Cc: Julia McCarthy/R8/USEPA/US@EPA, Marcel Tchaou/DC/USEPA/US@EPA
Date: 12/22/2010 11:30 AM
Subject: Re: Next set of tasks - Spruce Appendices

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Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

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Date: 12/22/2010 10:30 AM
Subject: Re: Next set of tasks - Spruce Appendices

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Ross

Ross Geredien
ORISE Fellow
EPA Office of Wetlands, Oceans, and Watersheds
202-566-1466
Geredien.ross(AT)epa.gov

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Thanks

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov

Christopher Hunter/DC/USEPA/US	To	Ross Geredien
12/23/2010 10:11 AM	cc	
	bcc	
	Subject	Fw: Spruce & 303(d)

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov
----- Forwarded by Christopher Hunter/DC/USEPA/US on 12/23/2010 10:11 AM -----

From:	Christopher Hunter/DC/USEPA/US
To:	Marcel Tchaou/DC/USEPA/US@EPA
Date:	12/23/2010 10:01 AM
Subject:	Fw: Spruce & 303(d)

Hi Marcel,
these will all need to be added to the reference files.
Thanks

Chris Hunter
U.S. Environmental Protection Agency
Office of Wetlands, Oceans, & Watershed
(202) 566-1454
hunter.christopher@epa.gov
----- Forwarded by Christopher Hunter/DC/USEPA/US on 12/23/2010 10:00 AM -----

From:	Greg Pond/R3/USEPA/US
To:	Stefania Shamet/R3/USEPA/US@EPA
Cc:	Christopher Hunter/DC/USEPA/US@EPA, Palmer Hough/DC/USEPA/US@EPA
Date:	12/20/2010 07:38 AM
Subject:	Re: Spruce & 303(d)

Here is the narrative section of the 2008 and 2010 IR. Public participation/Response Summary is found on page 34 in the 2008 IR, and on page 35 in the draft 2010 report. I did not clip the "responses" and put in a separate document per se as you requested.

WV_IR_2008_Report_Only_EPA_Approved.pdf WV_2010_IR_Narrative_Only_FINAL_20101109.pdf
WV_2010_IR_Narrative_and_Supplements_FINAL_20101109.pdf

Greg Pond
Office of Monitoring and Assessment
U.S. EPA Region 3
1060 Chapline Street, Suite 303
Wheeling, WV 26003-2995
(p) 304-234-0243
(f) 304-234-0260

pond.greg@epa.gov
Website: http://epa.gov/reg3esd1/3ea50.htm

Stefania Shamet	Greg -- could you please sent the 2008 and 201...	12/20/2010 05:16:12 AM

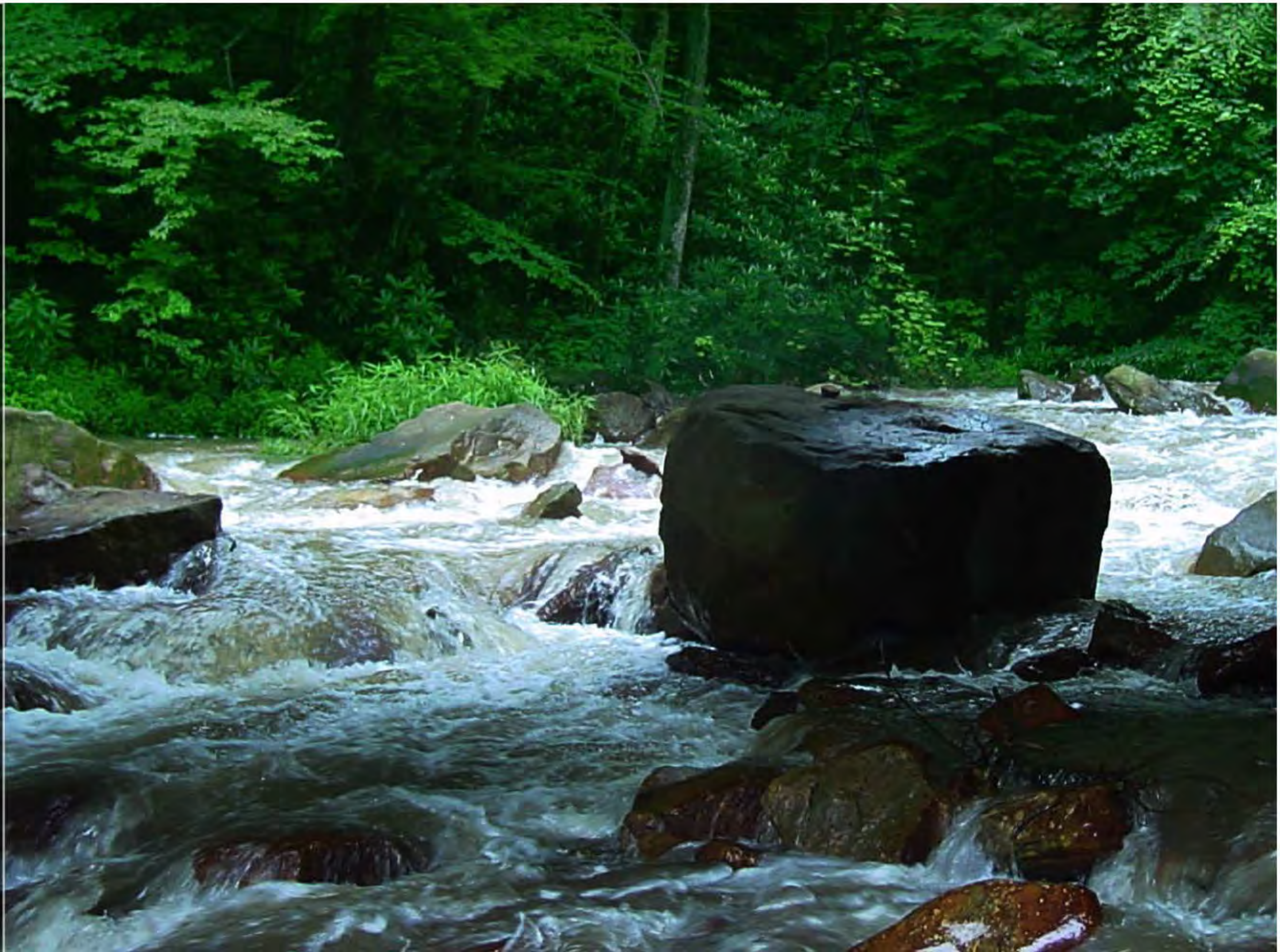
From: Stefania Shamet/R3/USEPA/US
To: Greg Pond/R3/USEPA/US@EPA
Cc: Palmer Hough/DC/USEPA/US@EPA, Christopher Hunter/DC/USEPA/US@EPA
Date: 12/20/2010 05:16 AM
Subject: Spruce & 303(d)

Greg -- could you please sent the 2008 and 2010 WVDEP response to comments on the 303(d) list to Chris & Palmer for inclusion in the Spruce Administrative Record?

In addition, Chris, Palmer -- Please include the 2010 list --it can be located at www.dep.wv.gov/WWE/watershed/IR/Pages/303d.305b.aspx

We refer to these in the response summary

Thanks.



2008

West Virginia Integrated Water Quality Monitoring and Assessment Report

West Virginia Department of Environmental Protection's Division of Water and Waste Management

dep

WEST VIRGINIA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2008

Prepared to fulfill the requirements of Sections 303(d) and 305(b) of the federal Clean Water Act and Chapter 22, Article 11, Section 28 of the West Virginia Water Pollution Control Act for the period of July 2005 through June 2007.

Joe Manchin III
Governor

Randy C. Huffman
Cabinet Secretary
Department of Environmental Protection

Scott G. Mandirola
Acting Director
Division of Water and Waste Management

www.wvdep.org
Promoting a healthy environment

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INTRODUCTION

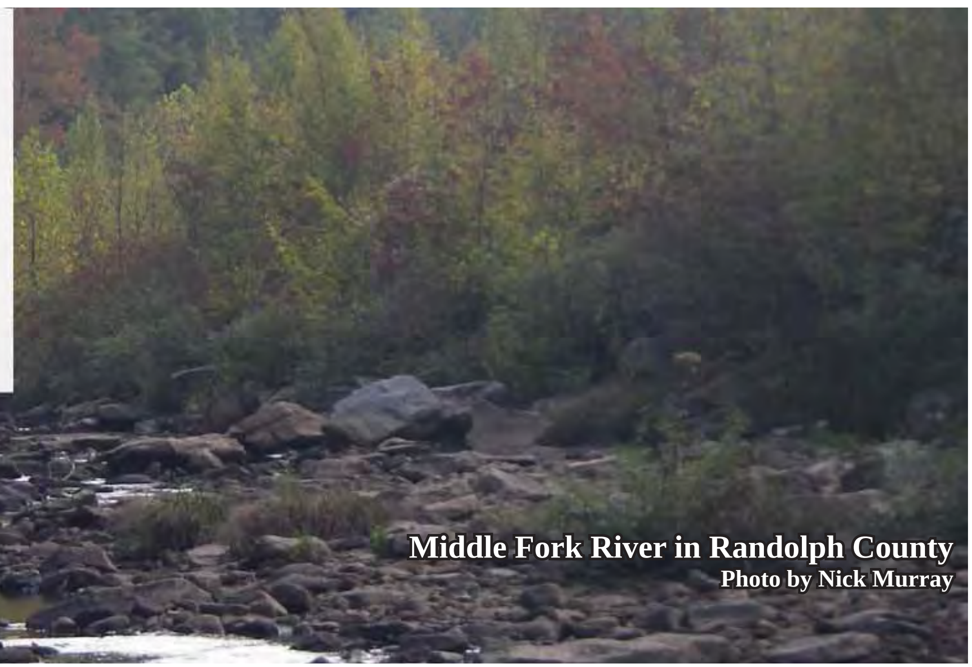
The federal Clean Water Act contains several sections requiring reporting on the quality of a state's waters. Section 305(b) requires a comprehensive biennial report and Section 303(d) requires, from time to time, a list of waters for which effluent limitations or other controls are not sufficient to meet water quality standards (impaired waters). West Virginia code Chapter 22, Arcticle 11, Seciton 28 also requires a biennial report of the quality of the state's waters.

This document is intended to fulfill West Virginia's requirements for listing impaired waters under Section 303(d) of the Clean Water Act and the Water Quality Planning and Management Regulations, 40CFR130.7. In addition to the list of impaired waters, it explains the data evaluated in the preparation of the list and methodology used to identify impaired waterbodies. Information is provided that allows the tracking of previously listed waters that are not contained on the 2008 list. EPA has recommended that requirements be accomplished in a single report that combines the comprehensive Section 305(b) report on water quality and the Section 303(d) List of waters that are not meeting water quality standards. The suggested format of this "Integrated Report" includes provisions for states to place their waters in one of the five categories described in Table 1.

This Integrated Report is the combination of the 2008 Section 303(d) List and the 2008 Section 305(b) report. This report includes data collected and analyzed up to June 30, 2007, from the state's 32 major watersheds by the West Virginia Department of Environmental Protection's (DEP's) Watershed Assessment Branch and other federal, state, private and nonprofit organizations. Waters that are included on the 2008 Section 303(d) List are placed in Category 5 of this report.

Table 1 - Integrated Report categories

Category 1	fully supporting all designated uses	
Category 2	fully supporting some designated uses, but no or insufficient information exists to assess the other designated uses	
Category 3	insufficient or no information exists to determine if any of the uses are being met	
Category 4	waters that are impaired or threatened but do not need a Total Maximum Daily Load	
	Category 4a	waters that already have an approved TMDL but are still not meeting standards
	Category 4b	waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses
	Category 4c	waters that have been determined to be impaired, but not by a pollutant
Category 5	waters that have been assessed as impaired and are expected to need a TMDL	



Middle Fork River in Randolph County
Photo by Nick Murray

WEST VIRGINIA WATER QUALITY STANDARDS

Water quality standards are the backbone of the 303(d) and 305(b) processes of the federal Clean Water Act. Instream data are compared with water quality standards to determine the use attainment status of streams and lakes. In West Virginia, the water quality standards are codified as 47CSR2 – Legislative Rules of the Department of Environmental Protection – Requirements Governing Water Quality Standards, and at 60CSR5 – Legislative Rules of the Department of Environmental Protection – Antidegradation Implementation Procedures. Impairment assessments conducted for the West Virginia 2008 Integrated Water Quality Monitoring and Assessment Report are based upon water quality standards that have received EPA approval and are currently considered effective for Clean Water Act purposes.

A waterbody is considered impaired if it violates water quality standards and does not meet its designated uses. It is then placed on the 303(d) List and scheduled for TMDL development. Use attainment is determined by the comparison of the instream values of various water quality parameters to the numeric or narrative criteria specified for the designated use (See the Assessment Methodology section for more information on use attainment determination).

Some examples of designated uses are water contact recreation, propagation and maintenance of fish and other aquatic life, and public water supply. Designated uses are described in detail in Section 6.2 of 47CSR2 and are summarized in Table 2. Each of the designated uses has associated criteria that describe specific conditions that must be met to ensure that the water can support that use. For example, the "propagation and maintenance of fish and other aquatic life" use requires that the pH remain within the range of 6.0 to 9.0 standard units at all times. This is an

Table 2 - West Virginia designated uses

Category	Use Subcategory	Use Category	Description
A	Public Water	Human Health	Waters, which, after conventional treatment, are used for human consumption.
B1	Warm Water Fishery	Aquatic Life	Propagation and maintenance of fish and other aquatic life in streams or stream segments that contain populations composed of all warm water aquatic life.
B2	Trout Waters	Aquatic Life	Propagation and maintenance of fish and other aquatic life in streams or stream segments that sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.
B4	Wetlands	Aquatic Life	Propagation and maintenance of fish and other aquatic life in wetlands. Wetlands generally include swamps, marshes, bogs and similar areas.
C	Water Contact Recreation	Human Health	Swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats.
D1	Irrigation	All Other	All stream segments used for irrigation.
D2	Livestock Watering	All Other	All stream segments used for livestock watering.
D3	Wildlife	All Other	All stream segments and wetlands used by wildlife.
E1	Water Transport	All Other	All stream segments modified for water transport and having permanently maintained navigation aides.
E2	Cooling Water	All Other	All stream segments having one or more users for industrial cooling.
E3	Power Production	All Other	All stream segments extending from a point 500 feet upstream from the intake to a point one-half mile below the wastewater discharge point.
E4	Industrial	All Other	All stream segments with one or more industrial users. It does not include water for cooling.

example of a numeric criterion. Numeric criteria are provided in Appendix E of the water quality standards.

Numeric criteria consist of a concentration value, exposure duration and an allowable exceedance frequency. The water quality standards prescribe numeric criteria for the "propagation of fish and other aquatic life" use in two forms: acute criteria that are designed to prevent lethality, and chronic criteria that prevent retardation of growth and reproduction. The numeric criteria for acute aquatic life protection are specified as one-hour average concentrations that are not to be exceeded more than once in a three-year period. The criteria for chronic aquatic life protection are specified as four-day average concentrations that are not to be exceeded more than once in a three-year period. The exposure time criterion for human health protection is unspecified but there are no allowable exceedances.

Water quality criteria also can be written in a narrative form. For example, the water quality standards contain a provision that states that wastes, present in any waters of the state, shall not adversely alter the integrity of the waters or cause significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. Narrative criteria are contained in Section 3 of 47CSR2. More information regarding the use of narrative criteria is contained in Section 5 under the discussions of decision criteria for biological impairment data and fish consumption advisories.

Ohio River criteria

For the Ohio River, both the Ohio River Valley Water Sanitation Commission (ORSANCO) and West Virginia water quality criteria were considered, as agreed upon in the ORSANCO compact. Where both ORSANCO and West Virginia standards contain a criterion for a particular parameter, instream values were compared against the more stringent criterion. The DEP supports ORSANCO's efforts to promote consistent decisions by the various jurisdictions with authority to develop 305(b) reports and 303(d) lists for the Ohio River. In support of those efforts, West Virginia has and will continue to work with ORSANCO and the other member states through a workgroup charged with improving consistency of 305(b) reporting among compact states.

SURFACE WATER MONITORING AND ASSESSMENT

This section describes West Virginia's strategy to monitor and assess the surface waters of the state. The DEP's Division of Water and Waste Management collects most of the state's water quality data. The Watershed Assessment Branch of DWWM is responsible for general water quality monitoring and watershed assessment. The remainder of this section describes the monitoring and assessment activities conducted by the Watershed Assessment Branch.

Streams and Rivers

West Virginia has a comprehensive strategy for monitoring the flowing waters of the state, by far the most prevalent surface waterbody type in the state. The Watershed Assessment Branch utilizes a tiered approach, collecting data from long-term monitoring stations, targeted sites within watersheds on a rotating basin schedule, randomly selected sites, and sites chosen to further define impaired stream segments in support of TMDL development. The following paragraphs present these approaches in further detail.

Probabilistic (random) sampling

Probabilistic sampling began in 1997. This program utilizes sites that are selected randomly by EPA's Western Ecology Division Laboratory in Corvallis, Ore. The data collected at these sites can be subjected to statistical analysis to provide an overall characterization of a watershed. This analysis can then be used to predict the probability of a condition occurring within a watershed. The initial probabilistic sampling cycle, which concluded in 2001, was conducted in accordance with the five-year Watershed Management Framework cycle. Thirty sites were sampled within each watershed. A second round of probabilistic sampling, initiated in 2002, modified the framework cycle to a statewide approach. The objective for the second round was to collect 30 samples from each watershed over a five-year period (six sites are collected from each watershed annually). Importantly, at the end of the five-year cycle, each of the state's major watersheds will continue to be independently characterizable.

This departure from the framework cycle minimizes the effects of extreme conditions, such as periodic droughts and flooding and allows for annual updates of statewide stream conditions. Data collection protocols are similar to those applied to watershed assessment sampling. However, probabilistic sampling includes more rigorous water quality and habitat analysis. Benthic macroinvertebrates are collected for biological community analysis.

The ambient water quality monitoring network

The ambient water quality monitoring network concept was established in the early 1960s. The network currently consists of 26 fixed stations that, starting in 2006, are sampled bi-monthly. Sampling stations are located at the mouths of the state's larger rivers and additional sites are situated to isolate the impacts from major industrial complexes and other potential sources of impairment. The data provides information for trend analyses, general water quality assessments and pollutant loading calculations, and allows water resources managers to quickly gauge the health of the state's major waterways.

Targeted sampling

Targeted sampling has been a component of West Virginia's assessment toolbox since the Watershed Assessment Program's inception in late 1995. Streams are sampled according to a five-year rotating basin approach. Sites are selected from the watersheds targeted for each particular year. Each site is subjected to a one-time evaluation of riparian and instream habitat, basic water quality parameters, and benthic macroinvertebrate and periphyton communities.

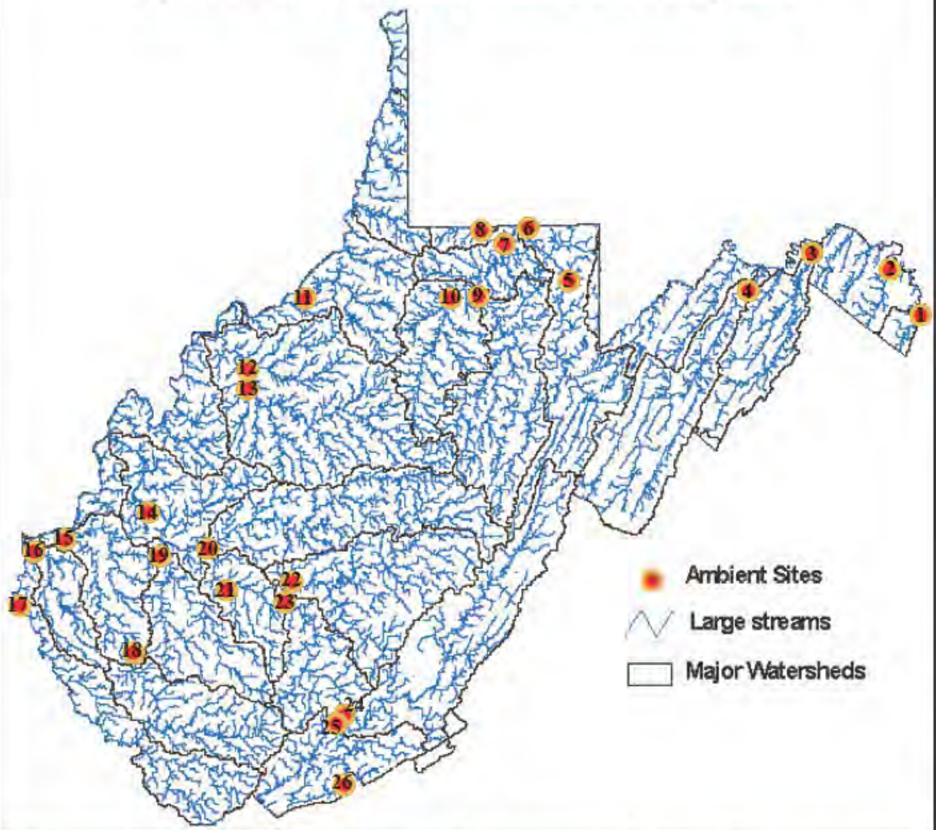
Sites are selected to meet a variety of the stakeholders' needs and include the following classifications:

- Impaired streams
- Reference (minimally impacted) streams
- Spatial trends (multiple sites on streams exceeding 15 miles in length)
- Areas of concern as identified by the public and stakeholders
- Previously unassessed streams

Pre-TMDL development sampling

As DEP started the process to assume TMDL development responsibility from EPA, the need for more and newer data in developing useful TMDLs was obvious. The objective of this effort is to collect sufficient data for TMDL modelers to develop stream restoration plans. Pre-TMDL sampling follows the framework cycle, i.e., impaired streams from watersheds in

Figure 1 – West Virginia's Ambient Monitoring Sites



1. Shenandoah River at Harpers Ferry	14. Kanawha River at Winfield
2. Opequon Creek east of Bedington	15. Guyandotte River at Huntington
3. Cacapon River near Great Cacapon	16. Twelvepole Creek south of Ceredo
4. South Branch of the Potomac River	17. Tug Fork at Fort Gay
5. Cheat River at Albright, W.Va.	18. Guyandotte River at Pecks Mill
6. Cheat River below Cheat Lake	19. Coal River at Tornado
7. Monongahela River in Star City	20. Elk River at Coonskin Park
8. Dundard Creek east of Pentress	21. Kanawha River at Chelyan
9. Tygart Valley River at Colfax	22. Gauley River at Beech Glen
10. West Fork River at Enterprise	23. New River above Gauley Bridge
11. Middle Island Creek at Arvilla	24. Greenbrier River at Hinton
12. Hughes River west of Freeport	25. New River at Hinton
13. Little Kanawha River at Elizabeth	26. New River at Virginia state line

hydrologic group A will be sampled in the same year as the targeted sampling.

Biological Indicators

Benthic macroinvertebrates are collected from riffle substrate in wadeable streams and identified to genus level. This assemblage of aquatic life organisms provides a direct means of assessing the aquatic life use support and can be collected and identified cost effectively. It has the advantage over one-time water quality samples in that the benthic community is affected by and provides indications of past water quality conditions. The DEP currently uses the West Virginia Stream Condition Index, a family-level multimetric index developed specifically for use in West Virginia. This is the primary means of assessing attainment of the aquatic life use.

The 303(d) List is the basis for initial site selection and additional sites are added to comprehensively assess tributary waters and to allow identification of the suspected sources of impairment. Benthic macroinvertebrate sampling is conducted in 303(d) listed streams having aquatic life impairments. Assessment of water quality impaired streams is more intensive and consists of monthly sampling for parameters of concern. This method captures data under a broad variety of weather conditions and flow regimes. Pre-TMDL sampling also includes an effort to locate the specific sources of impairment, with particular attention to identify non-point land use stressors as well as any permitted facilities that may not be meeting their requirements. For more information, see TMDL Development Process.

Lakes and Reservoirs

West Virginia does not make a distinction between lakes and reservoirs. By state definition, a publicly owned lake is any lake, reservoir, or pond that meets the definition of "waters of the state," is owned by a government agency or public utility, and is managed as a recreational resource for the general public. The DEP conducted lake water quality assessments from 1989 through 1996. This program was funded by the federal Clean Lakes Program, which was phased out in 1995. With additional financial support being provided to enhance state's monitoring strategies, DEP added a lake monitoring component in 2006. This program focuses on water quality, collecting field parameters (dissolved oxygen, pH, temperature, and conductivity), nutrient data, clarity, and Chlorophyll A. Multiple sites per lake are sampled and profile data for temperature and dissolved oxygen are obtained.

Many of West Virginia's largest reservoirs are controlled by the U.S. Army Corps of Engineers. Although the Corps' primary mission is to manage structures to provide navigation and flood control, the agency also is committed to water quality management. Data generated by the Corps has been used for assessment purposes. Additional lake information is available from the West Virginia Division of Natural Resources. The DNR, one of the signatory agencies in the Partnership for Statewide Watershed Management, conducts fish community surveys on many of the state's reservoirs.

Wetlands

The State of West Virginia takes great interest in the management of its wetlands both large and small. According to figures from the National Wetlands Inventory (NWI 1980-86), there are 102,000 wetland acres in West Virginia comprising less than 1% of the State's total land area. Current wetland information can be found in a booklet entitled West Virginia's Wetlands…Uncommon, Valuable Wildlands (Tiner 1996). Currently, management efforts are geared toward protection of wetlands by regulatory proceedings or acquisition. The permitting authority for activities impacting wetlands (Section 404) lies with the U. S. Army Corps of Engineers. In addition, the West Virginia Department of Environmental Protection ensures protection through an active Section 401 certification program.

Since the 2006 Integrated Report, certain changes have occurred in the status of West Virginia's wetlands program. Although limiting these changes are intended to be the start of a larger and more comprehensive program. DEP's Watershed Assessment Branch personnel have been researching and developing assessment and monitoring strategies in conjunction with the U.S. Environmental Protection Agency and other states. DEP is also maintaining contact with EPA in preparation for the National Wetlands Assessment in 2011. This national assessment will encompass the entire United States with DEP and West Virginia Division of Natural Resources (DNR) combining efforts to assess sites in West Virginia. In support of this effort, DNR's Wildlife Resources Section is currently evaluating aerial photography to identify wetlands not included in the original National Wetlands Inventory (NWI 1980-86) due to size or age. The results of this project will provide updated information similar to that of the NWI 1980-86, but will also include wetlands created since 1986 and wetlands smaller that those which could be detected in the NWI 1980-86(<1-3 acres).

The EPA plans to advise states on assessment methods and actual site locations by September 1, 2009. As a result of the 2011 NWI, additional valuable information on the number and condition of West Virginia's wetlands will be available from EPA, DEP and DNR.

Citizen monitoring

The fourth stream assessment project is the West Virginia Save Our Streams volunteer monitoring program. Initiated in 1989, this program encourages citizens to become involved in the improvement and protection of the state's streams. The focus is largely on nonpoint source pollution abatement. Save Our Streams has two objectives. First, it provides the state with enhanced ability to monitor and protect its surface waters through increased water quality and benthos data collection. Second, it improves water quality through educational outreach to the state's citizens. After citizens are actively involved in stream monitoring and restoration activities, they can initiate improvement projects within their own watersheds. Training workshops are conducted annually to provide quality assurance. A recent improvement in data accessibility for the program has been the development of an online Volunteer Assessment Database. As an example of the functions of the new database, volunteer stream reports are now available online at http://www.wvdep.org/dwwm/wvsos/vad/index.htm.

Volunteer monitors can register on the database and enter their own data online, or continue to submit the information to the coordinator for a quality assurance review. The coordinator also is the database administrator, and has tools to verify the quality of the information before it is approved. The database is available for public viewing without registration. In addition, the program prepares an annual "State of Our Streams" report.jl

Table 3 - Current and future monitoring activities
26 Ambient sites will be monitored bi-monthly from July 2007 through June 2009
A third round of probabilistic monitoring that began in the spring of 2007 will continue through 2011.
Pre-TMDL development monitoring for Group B – 419 sites from 279 streams were sampled from July 2007 through June 2008. (179 sites from the Elk River Watershed, 176 from the Lower Kanawha River Watershed, and 64 from the North Branch Potomac Watershed)
TMDL development for Group C – 419 sites from 267 streams will be sampled from July 2008 through June 2009.
Group B Targeted Sampling – 76 targeted sites were sampled in 2007.
Group C Targeted Sampling – Approximately 75 sites will be sampled during the 2008 summer sampling season.
Lakes – Ten lakes within Group C will be sampled four times during the 2008 growing season (May through October) and approximately 10 Group D Lakes will be sampled in 2009.

DATA MANAGEMENT

Assessed data

All readily available data was used during the evaluation process. In preparation for the development of this report, the agency sought water quality information from various state and federal agencies, college and universities, private individuals, businesses, organizations and others. News releases and public notices were published in state newspapers. Specific requests for data were made to state and federal agencies known by the DEP to be generators of water quality data. Table 4 identifies the entities that contributed water quality data. The DEP's staff reviewed data from external sources to ensure that collection and analytical methods, quality assurance and quality control and method detection levels were consistent with approved procedures. In addition, DEP has developed guidance for those wishing to submit data. The document contains a list of requirements for submitted data along with helpful internet links and a checklist for data submitters. The guide can be found on DEP's Web site using the following link:

http://www.wvdep.org/Docs/13395_QA%20Guidelines%20(PIO%20 revised).doc

Analytical methodology is normally limited to the procedures contained in the federal regulations of 40CFR136. In limited instances, where 40CFR136 does not include sampling or analytical techniques for a particular pollutant, or where 40CFR136 techniques cannot effectively characterize water quality, results obtained from alternative, scientifically-defensible analytical methodologies have been accepted. Although it is a primary consideration in the evaluation of the acceptability of monitoring results, monitoring and analysis pursuant to 40CFR136 approved methods is not mandated for Section 303(d) or 305(b) processes. 40CFR136 does not always contain approved methods for parameters with water quality criteria. In such instances, monitoring and analysis under other scientifically valid methodologies may be appropriate. For example, "free cyanide," which is commonly required in NPDES permits to be analyzed by the weak acid dissociable cyanide method contained in "Standard Methods," is similarly qualified as appropriate. In other scenarios, 40CFR136 methods may not provide the analytical sensitivity necessary for assessment, and data from alternative scientifically defensible methodologies may be accepted. ORSANCO's use of high volume monitoring techniques for assessment of dioxin in the Ohio River is a primary example.

Table 4 - Data providers for the 2008 303(d) List and Integrated Report*

Alex Energy (Massey Energy Company)	Alliance Coal, LLC	Alpha Coal and Coastal Coal
Bio-Chem Testing, Inc.	Cacapon Institute	Consolidation Coal Company
Cranesville Stone, Inc.	Friends of Cheat	Friends of Deckers Creek
Greenbrier River Watershed Assoiciation	Green Valley (Massey Energy Company)	National Park Service
New Land Leasing Compnay	Orchard Coal	ORSANCO
Pace Carbon West Virginia Synthetic	Patriot Mining Company, Inc.	Peerless Eagle (Massey Energy Company)
Plateau Action Network	Preston County Coal and Coke Corporation	DEP Stream Restoration Group
Upper Guyandotte Watershed Association	U.S. Army Corps of Engineers	U.S. Geological Survey
WVU Water Research Institute	West Virginia Bureau for Public Health	West Virginia Department of Agriculture
West Virginia Department of Environmental Protection	West Virginia Division of Natural Resources	West Virginia Wesleyan College

* Additional entities provided data during the draft 303(d) comment period, March 24, 2008 until June 6, 2008. See the Public Participation and Responsiveness Summary

Assessment decisions are made using the most accurate and recent data available to the agency. For stream water quality assessments, DEP generally used water quality data generated between July 2002 and June 2007. The use of data more than five years old is intentionally limited. In the absence of new information, previous assessments are carried forward even if the data becomes older than five years. Additionally, if a water quality criteria change is approved which affects an older assessment, the new assessment will only reflect the current criteria.

Waters are not deemed impaired based upon water quality data collected when stream flow conditions are less than 7Q10 flow (the seven consecutive day average low flow that recurs at a 10 year interval) or within regulatory mixing zones. Further, waters are not deemed impaired based upon "not-detected" analytical results from methodologies that have detection limits that are not sensitive enough to confirm criteria compliance.

Water Analysis Database - WabBase

The Division of Water and Waste Management has generated the majority of the available water quality data. Currently all targeted, probabilistic, and pre-TMDL development monitoring data is managed in an inhouse database (WabBase). WabBase houses most water quality, habitat, watershed characteristics, macroinvertebrate data (both raw data and calculated metrics) and supporting information collected by the Watershed Assessment Section.

External data providers

Data submitted from sources outside of the Watershed Assessment Section were considered in the development of this report. This also includes data from other DEP programs. The external data providers are listed in Table 4. Once data was submitted, the DEP performed the following:

- Determined quality and quantity
- Formatted data for evaluation
- Determined stream codes and mile points
- Used qualified data from external sources to make assessment decisions

USE ASSESSMENT PROCEDURES

The primary focus of the Integrated Report is to assess water quality information and determine if the designated uses of state waters are supported. After use assessment, waters are placed into one of five categories as described in the introduction. This section describes the various protocols used to determine use impairment and place waters on the Section 303(d) List and in Category 5 of this report. It also describes the protocols to categorize the remaining waters where uses have not been determined to be impaired. If a water has any impaired use, it is placed in Category 5. Other waters may be placed in Category 1, 2, 3, or 4 depending upon the available water quality data and TMDL development requirements and status.

303(d) Listing Methodology

Numeric water quality criteria

The EPA's most recent guidance for assessment and listing encourages decision criteria commensurate with the implementation provisions of a state's water quality standards, such as the concentration value, exposure duration and allowable exceedance frequency as described in the Water Quality Standards section. Previously, EPA has encouraged 303(d) listing decisions relative to numeric water quality criteria to be based primarily upon the frequency of exceedance of the numeric criteria and the "10-percent rule." Usually, if more than 10 percent of the observed values exceeded the concentration value of an applicable numeric criterion, then the water was considered impaired and placed on the 303(d) List.

Typically, if an ample data set exists and exceedances of chronic aquatic life protection and/or human health protection criteria occur more than 10 percent of the time, the water is considered to be impaired. If the rate of exceedance demonstrated is less than or equal to 10 percent, then the water is considered to be meeting the designated use under evaluation. Ample data sets are defined as sets with 20 or more distinct observations. If fewer than 20 samples per station or representative area exist and three or more values exceed a criterion value, then the water also is considered to be impaired. For this scenario (three observed violations), if additional non-exceeding monitoring results were available that would increase the data set size to 20 observations, a greater than 10 percent exceedance frequency would still exist.

Under West Virginia Water Quality Standards, acute aquatic life protection criteria have associated exposure durations of one hour and may be exceeded once every three years. The normal practice of "grab-sampling" ambient waters is generally consistent with the one-hour exposure duration specified in the standards. Therefore, a direct application of the allowable exceedance frequency provided in the standards is made when assessing impairment relative to acute aquatic life protection criteria. If two or more exceedances of acute criteria are observed in any three-year period, the water is considered to be impaired.

If the data being evaluated is generated as part of a comprehensive network being monitored for a specific purpose, the data may be assigned a higher level of assessment quality, and the "10-percent rule" may be applied with confidence to data sets containing less than 20 observations per station. The primary example of an intensified monitoring program that generates higher assessment quality data is that which is conducted by DEP to support TMDL development. The pre-TMDL monitoring format includes flow measurement and monthly water quality monitoring for one year at multiple locations throughout a watershed. Information is generated over a range of stream flow conditions and in all seasons. Habitat assessment and biological monitoring is performed in conjunction with water quality monitoring. The information generated under this format is among the most comprehensive available for assessing water quality. Upon conclusion of monitoring, it is then necessary for agency personnel to make a definitive judgment relative to impairment. In most instances, application of the "10-percent rule" to the pre-TMDL monitoring data sets result in the classification of waters as impaired if two or more exceedances of a criterion are demonstrated.

Table 5 summarizes the criteria used to make 303(d) impairment decisions relative to numeric water quality criteria.

Segmentation of streams

For the 2008 listing cycle, DEP has chosen to represent the majority of newly listed streams as impaired for their entire length and has only segmented newly listed streams in limited situations.

First, segmentation may be justified when a sizable impoundment is located on the stream. An impoundment acts as physical barrier between the upper and lower reaches of a stream thereby interrupting natural

Table 5 - Numeric water quality decision criteria for listing of impaired waters		
Water Quality Criteria	Impairment Thresholds	Exceptions
Acute Aquatic Life Protection (Use Category B)	The water is impaired if two exceedances of acute aquatic life protection numeric criteria occur within any three-year period.	If, in the most recent three-year period, no exceedances of criteria are evidenced and at least 12 monitoring results are available, then the water is not considered impaired.
Chronic Aquatic Life Protection (Use Category B) Human Health Protection (Use Categories A and C)	The water is impaired if a greater than 10% frequency of exceedance is demonstrated in an ample dataset (20 or more available observations). The water is impaired if three exceedances of criteria occur with less than 20 available monitoring results. The water is impaired if a greater than 10% frequency of exceedance is demonstrated with less than 20 available observations, if the data being evaluated is of high assessment quality (> two violations)	If, for waters with regularly scheduled monitoring, in the most recent two-year period, no exceedances of criteria are evidenced and at least eight observations are available, then the water is not considered impaired.

stream flow and changing water quality. Certain physical characteristics, such as temperature and dissolved oxygen, can vary widely based on the depth at which the discharge water is drawn. Often a properly maintained impoundment removes excess sediment which can be responsible for violations of iron water quality criteria. This type of situation results in a stream being listed for violations of iron criteria above the impoundment with no violations or listings noted downstream of the impoundment.

Secondly, stream segmentation may occur when DEP has knowledge of a specific source of impairment or where biological assessments allow DEP to distinguish between impaired and clearly unimpaired segments and present the information.

Thirdly, segmentation of large watersheds, such as the Ohio River, is often necessary to provide a clear understanding of water quality impairments. It allows the presentation of information for each segment detailing the length and type of impairment. In addition, this type of segment specific information is often helpful in locating pollutant sources.

Finally, segmentation is useful in understanding changes in a stream's designated use. For example, the headwaters of certain streams are designated as trout waters based on characteristics such as temperature, habitat and the fact they hold year round populations of trout. Occasionally, as those waters flow downstream, both temperature and habitat change to a point that they no longer support trout. As a result of these changes, the lower portion of the stream is classified as a warm water fishery. Since trout water criteria differ significantly from warm water criteria, stream segmentation is used to reflect the change in designated use.

Except for the above-mentioned scenarios, segmentation at the time of listing is generally not pursued. If segmentation is based solely upon the limited amount of water quality monitoring data that is usually available, it may not accurately portray the extent of impairment and may contradict the ultimate findings of the TMDL that the listing mandates. The DEP believes the TMDL development process, which links water quality monitoring with pollutant sources through computer modeling, provides the best assessment of criterion attainment and the most accurate identification of the watershed sources for which pollutant reductions are necessary. TMDL modeling predicts water quality over a wide range of climatic and stream flow conditions and prescribes pollutants allocations that will result in attainment of criteria in all stream segments. In contrast to the "grab sampling" associated with water quality monitoring, TMDL modeling incorporates the specific exposure duration and exceedance frequency terms of water quality criteria.

Evaluation of fecal coliform numeric criteria

Fecal coliform assessments were based on the previously described decision criteria for numeric water quality criteria. Given the complexity of this particular criteria, most assessments are performed by comparing observations to the “maximum daily” criterion value of 400 counts/100ml. Evaluation of the monthly geometric mean fecal coliform criterion (200 counts/100ml) occurs only where five or more individual sample results are available within a calendar month.

Numeric fecal coliform water quality criteria are applicable to the Water Contact Recreation and Public Water Supply designated uses. Section 8.13 of Appendix E of the West Virginia Water Quality Standards states: *Maximum allowable level of fecal coliform content for Primary Contact Recreation shall not exceed 200/100ml as a monthly geometric mean based on not less than five samples per month; nor to exceed 400/100ml in more than 10 percent of all samples taken during the month.*

A practical difficulty exists in accurate assessment of criteria compliance due to the resource commitment that would be necessary to perform monitoring at a sufficient frequency to make determinations using the geometric mean criteria, since the monthly geometric mean criterion is conditioned upon the availability of at least five distinct sample results in a month. The “maximum daily” criterion is not conditioned by a minimum sample set requirement, but practical use of the apparent 10 percent exceedance allowance would involve at least 10 samples per month.

The most frequent and regular fecal coliform water quality monitoring conducted by the Watershed Assessment Section is once per month. That monitoring frequency precludes assessment of the monthly geometric mean criterion and hampers accurate assessment of the maximum daily criterion. Due to limited resources, more frequent fecal coliform monitoring could only be accomplished by significantly reducing the number of West Virginia streams and/or stations where water quality assessments are performed. The DEP does not consider that to be a reasonable alternative.

The DEP uses the following protocols when making assessments relative to fecal coliform numeric criteria:

- *No assessments are based upon the monthly geometric mean criterion (200 counts/100ml) unless an available data set includes monitoring at five per month or greater frequency. When data sets are available, the listing decision criteria for numeric water quality criteria are applied, considering each monthly geometric mean as an available monitoring result.*
- *The listing decision criteria are applied to the maximum daily criterion (400 counts/100ml) and available individual monitoring results, but without the monthly prejudice. For example, if twice per month monitoring is conducted for a year and two results in two separate months are greater than 400, the stream would be assessed as fully supporting (2/24 – 8.3 percent rate of exceedance) rather than insufficient data (two months per 12 months exceedance). If five samples per month monitoring is conducted for one year and four daily results greater than 400 are measured in four different months, the stream would be assessed as fully supporting (4/60 – 6.7 percent rate of exceedance) rather than nonsupporting (four months per 12 months exceedance), provided that the monthly geometric means were below the 200 counts/100 ml criteria.*

The decision criteria does not provide for 303(d) listing of waters with severely limited data sets and exceedance (i.e., one sample in a five-year period > 400 counts/100ml). Such waters would be classified as having insufficient data available for use assessment. DEP will target these “fecal one-hit” waters for additional monitoring by incorporating them into the pre-TMDL monitoring plans at the next opportunity for TMDL development in their watershed. Where the intensified pre-TMDL monitoring (monthly sampling for one year) indicates impairment, TMDL development will be immediately initiated, even though the water may not be included in Category 5 of the current Integrated Report.

Evaluation of pH numeric water quality criteria data

For the 2006 303(d) List, the DEP evaluated all recent (July 2000 – June 2005) pH water quality data under the previously described listing criteria requirements for numeric water quality criteria. Waters were identified as impaired for pH if the data exceeded listing requirements criteria or if the water was previously listed and insufficient new data were available to reassess the water. The impaired lengths of certain streams were adjusted to recognize ongoing limestone treatment operations that have resulted in the attainment of the pH criterion in the treated segments.

Narrative water quality criteria – biological impairment data

The narrative water quality criterion of 47CSR2 – 3.2.i. prohibits the presence of wastes in state waters that cause or contribute to significant adverse impact to the chemical, physical, hydrologic and biological components of aquatic ecosystems. Streams are listed as biologically impaired based on a survey of their benthic macroinvertebrate community. Benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams of West Virginia. The West Virginia Stream Condition Index (WVSCI) is composed of six metrics that were selected to maximize discrimination between streams with known impairments and reference streams. Streams with WVSCI scores of less than 60.6 are considered biologically impaired and included on the 303(d) List. Benthic macroinvertebrates are collected with a 500 mm mesh rectangular dip net. The kick sample is collected from the 1.0 m^2 area of substrate. Identifications are completed for a 200-organism subsample. The WVSCI was developed from data using these methods. Streams are listed as being biologically impaired only if the data was comparable (e.g., collected utilizing the same methods used to develop the WVSCI, adequate flow in riffle/run habitat, and within the current index period.

Most streams with low biological scores are listed as having an unknown source/cause of impairment on the 303(d) List and most are listed, by default, for their entire length. It is doubtful that the entire length of every stream is impaired, but without further data, the exact length of impairment is unknown. Each listed stream will be revisited prior to TMDL development. The additional assessments performed in the pre-TMDL monitoring effort will better define the impaired length. The causative stressor(s) of the impairment and the contributing sources of pollution also will be identified during the TMDL development process. If the stressor identification process demonstrates that the biological impairment is not caused by a pollutant, then no TMDL will be developed.

Certain biologically impaired streams have been evaluated but they were not immediately placed on the 303(d) List or in Category 5. The impairment source for these streams has been linked to a pollutant for which a TMDL has already been developed. An example scenario would be a low biological score on a stream that has a TMDL developed for mine drainage. If the pollutant reductions specified by the TMDL are achieved, the biological community would likely restore itself. In these cases, after careful evaluation, the stream was not listed or placed in Category 5 because the full implementation of an existing TMDL is expected to correct the problem. If implementation of the TMDL resolves the pollutant

Nick Murray working on collecting a benthic sample in Glady Fork in Randolph County
Photo by Jeff Bailey

specific impairment but biological scores remain low, then the biological impairment would be listed and the stream would return to Category 5.

Narrative water quality criteria – fish consumption advisories

The narrative water quality criterion of 47CSR2 – 3.2.e prohibits the presence of materials in concentrations that are harmful, hazardous or toxic to man, animal or aquatic life in state waters. Fish consumption advisories are used to inform the public about potential health risks associated with eating fish from West Virginia's streams. The DEP, DNR, and the Bureau for Public Health have collaborated on fish contamination issues since the 1980s; however, an executive order by the governor in 2000 mandated a formal collaborative process to issue fish consumption advisories. Fish consumption advisories are developed and issued in accordance with an interagency agreement. In the absence of specific body-burden criteria, the presence of contaminants in fish tissue in amounts equivalent to a two meal per month advisory is considered sufficient evidence of impairment.

Risk-based principles are used to determine whether fish consumption advisories are necessary. These advisories are used as a public education tool to help citizens make informed decisions about eating fish caught in state streams. The risk-based approach estimates the probability of adverse health effects and provides a statement on the health risk facing the angler and high-risk groups including women of childbearing age and children. West Virginia's fish consumption advisories include guidelines on the number of meals to eat and information on proper fish preparation to further minimize risk.

Waterbody-specific fish consumption advisories are on 13 state streams and four lakes for a variety of fish species and contaminants. Additionally, there is a general statewide advisory that recommends limiting the consumption of certain sport-caught fish from all West Virginia waters in relation to low-level mercury and/or polychlorinated biphenyl (PCB) contamination. The statewide advisory provides species-specific recommendations ranging from one meal per week to one meal per month.

The listing of waters based on fish consumption advisories is strongly supported by EPA. For PCBs, waters are considered impaired if at least one monitoring result for tissue from a commonly consumed species exceeds the two meal per month advisory trigger. In regard to mercury, West Virginia water quality standards contain a numeric body-burden criterion for methylmercury in fish tissue. The criterion for protection of public water supply and water contact recreation designated uses is 0.5 µg/g. In the Ohio River, the applicable ORSANCO body-burden criterion is 0.3 µg/g. Fish tissue mercury impairment decisions are based upon a direct comparison of available observations to the body-burden criteria.

Categorization of nonimpaired waters

The following paragraphs describe protocols used to determine use support and to place waters in either Category 1, 2, or 3.

Use support

Stream segments that support all of the designated uses are placed in Category 1. This section describes the guidelines used by the DEP to demonstrate use-support for each of the designated uses.

Not all parameters with applicable numeric criteria must be monitored to determine use support. A supporting assessment is made if certain mandatory parameters have been monitored and those results demonstrate compliance with criteria. If monitoring results are available for "non-mandatory" parameters, they also must indicate compliance with the criteria for those parameters if a fully supporting assessment is made. For limited data sets (less than 20 samples per station), no criteria exceedances can be evident. If 20 samples per station or more are available, then compliance would be determined by application of the listing criteria (i.e., less than 10 percent exceedance rate for chronic aquatic life and human health criteria, less than two violations of acute criteria in a three-year period, no violations in the most recent two- or three-year period, as applicable).

Category B (aquatic life) designated uses

For this use to be supported, biomonitoring must have been performed and results must show a WVSCI score > 68.0. Also, there must not be any exceedance of any other aquatic life protection water quality criteria (less than 20 samples per station) or any exceedance of listing criteria (20 samples per station or more).

The WVSCI methodology can be applied only to wadeable streams. Most nonwadeable streams are part of the Ambient Water Quality Monitoring Network and are sampled every two months for a variety of pollutant parameters. If no exceedance of listing criteria (for aquatic life criteria) is demonstrated and no other information demonstrates adverse impact to aquatic ecosystems, then the aquatic life use is considered supported.

Category A (public water supply) and C (contact recreation) designated uses

For these uses to be supported, at least one fecal coliform monitoring result less than 400 counts/100ml must be available. Also, there must not be any exceedance of any other human health protection water quality criteria (less than 20 samples per station) or any exceedance of listing criteria (20 samples per station or more) for the uses to be supported.

Category D (agriculture and wildlife) and E (water supply industrial, water transport, cooling and power) designated uses

For these uses to be supported, pH and dissolved oxygen must have been monitored and results must indicate compliance with criteria. Also, there must not be any exceedance of any other Category D and E water quality criteria (less than 20 samples per station) or any exceedance of listing criteria (20 samples per station or more).


Cow Creek in Putnam County
Photo by Doug Wood

Insufficient data

Stream segments without sufficient data to determine use support or impairment may be placed in either Category 2 or 3. Category 2 houses waters with some uses determined to be supported, but lacking sufficient information to assess other uses. Waters are placed in Category 3 if insufficient or no information exists to determine if any of the uses are being met.

The use is not assessed when there is some water quality data available, but not enough to conclude that the use is fully supporting or not supporting. The following situations produce an insufficient data designation:

- Instream monitoring results demonstrated criteria exceedances, but at a frequency insufficient to deem the use impaired
- Water quality data is available for some parameters but is not available for mandatory parameters
- Biological assessment returned a gray result (WVSCI score between 60.6 and 68.0)

A use is not assessed if a stream has not been sampled within the last 15 years for any parameter that has an applicable water quality criteria for the use being evaluated.

ASSESSMENT RESULTS

This section contains the results from all the data that has been assessed for West Virginia waterbodies. Table 6 shows a summary of the classification of West Virginia waters under the five "Integrated Report" categories (see page 5). The results reveal that 27% of West Virginia's stream miles are in either Category 1 or 2 (fully supporting all or some assessed uses).

Table 6 - 2008 Category Summary Report for West Virginia

LAKES					
Type	CATEGORY	# of lakes	% lakes	acres	% acres
Lake	1	27	21	1055	5
Lake	2	42	32	5219	24
Lake	3	41	32	77	0
Lake	4a	9	7	193	1
Lake	5	11	8	15036	70
	TOTAL	**130**	**100**	**21580**	**100**
STREAMS					
Type	CATEGORY	# of stream segments	% stream segments	miles of streams	% miles
Stream	1	1295	12	4831	16
Stream	2	875	8	3250	11
Stream	3	6779	62	12066	40
Stream	4a	999	9	3981	13
Stream	4b	2	0	2	0
Stream	4c	36	0	35	0
Stream	5	971	9	6157	20
	TOTAL	**10957**	**100**	**30322**	**100**

Category 3, streams with insufficient data, makes up 40% of stream miles, the largest percentage of the five categories. However, that number is somewhat deceiving. The streams with limited data are typically small unnamed tributaries, which usually contribute to the larger waterbodies which have been assessed. All major rivers in the state; the Kanawha, Monongahela and Little Kanawha rivers, have data and have been assessed and placed into one of the other four categories. One-third of West Virginia's streams are impaired and fall into either Category 4 or 5.

Category 1, Category 2, and Category 3 watere are quite large, therefore, they are not published in this document. The three categories can be viewed on DEP's website, www.wvdep.org. Waters listed in category 4 are included in the supplements toward the back of this document in Supplemental B, B1, and D sections. Category 5 waters are included in the document and is the 303(d) List. 2

Category 5 includes 971 impaired stream segments, covering approximately 6,157 stream miles that are impaired and need TMDLs developed. This number has decreased from 6,595 miles of impaired streams identified on the 2006 list. The decrease is due, in part, to numerous TMDLs that have been developed and approved since publication of the 2006 report.

Table 7 contains a detailed breakdown of use support specific to the use categories for West Virginia waters as set forth in the Water Quality Standards (47CSR2).

The most common impairments of West Virginia waters are:

- Biological impairment, as determined through application of the West Virginia Stream Condition Index
- Bacterial contamination evidenced by exceedance of numeric water quality criteria for fecal coliform
- Exceedance of numeric water quality criteria for pollutants associated with mine drainage (low pH, and high concentration of iron, aluminum, and/or manganese)
- Hg and PCB fish tissue contamination, and
- Low pH associated with acid rain

The list and the summary results of Tables 8 and 9 provide an overview of the impairment status of West Virginia waters. An alternative mechanism for assessing general status and the relative impacts of various causes and sources is provided by DEP's Probablistic Monitoring Program. The program and assessment results are described in the Probabilistic Data Summary section.

Table 7 - West Virginia use support summary

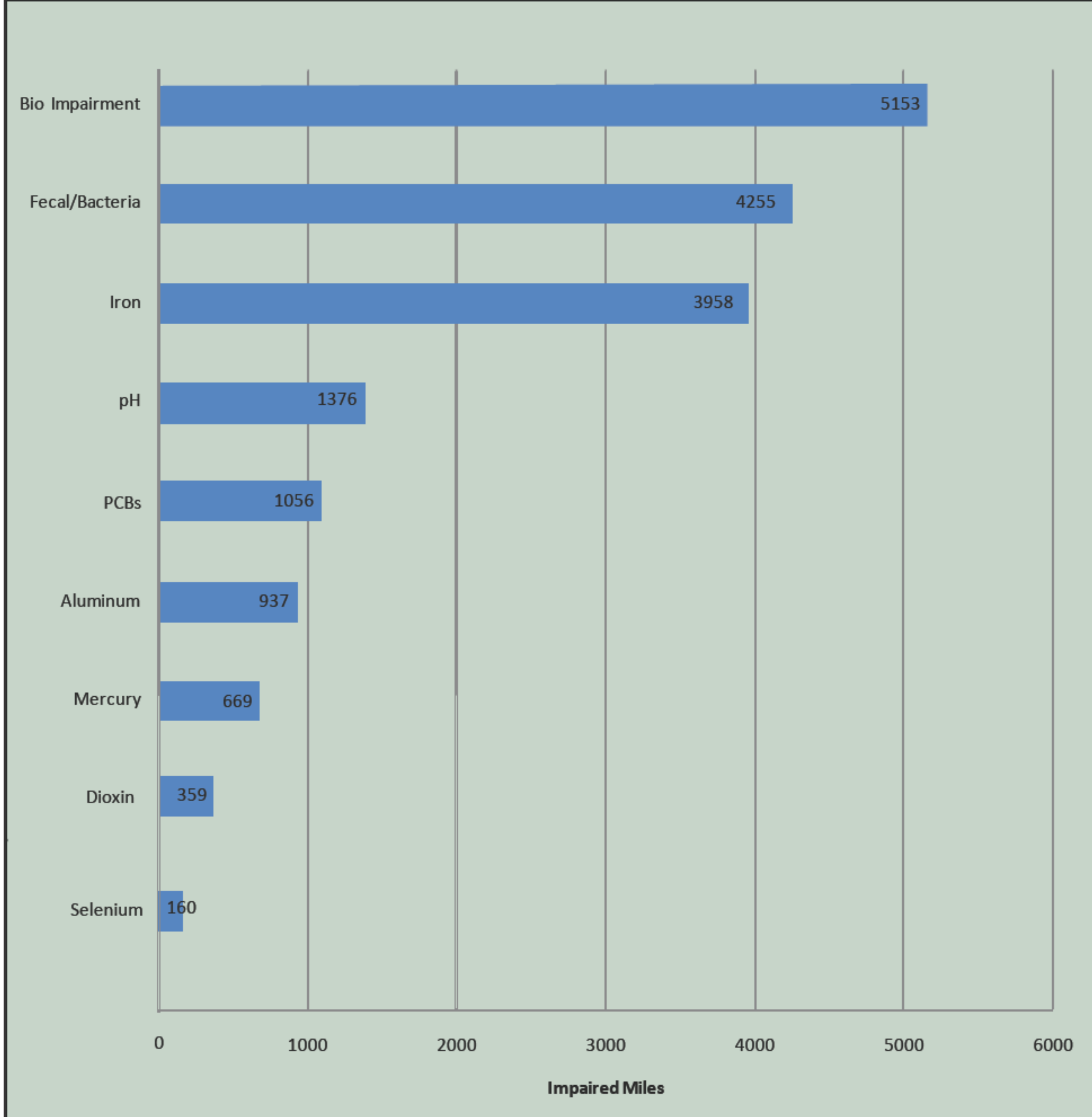
LAKES																		
Designated Use	Number of Lakes	Size (acres)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Acres	%	#	%	Acres	%	#	%	Acres	%	#	%	Acres	%
A - Public Water	130	21580	27	21	1055	5	43	33	5263	24	40	31	33	0	20	15	15229	71
B1 - Warm Water Fishery	111	16241	26	23	1065	7	27	24	4114	25	40	36	33	0	18	16	11029	68
B2 - Troutwater	19	5339	12	63	1014	19	5	26	125	2	0	0	0	0	2	11	4200	79
C - Contact Recreation	130	21580	66	51	3878	18	5	4	2452	11	47	36	206	1	12	9	15044	70
D - Agriculture and Wildlife	130	21580	70	54	6994	32	2	2	56	0	50	38	5324	25	8	6	9206	43
E -Industrial	130	21580	70	54	6994	32	2	2	56	0	50	38	5324	25	8	6	9206	43
Total	**130**	**21580**																

STREAMS																		
Designated Use	Number of Stream Segments	Size (miles)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Miles	%	#	%	Miles	%	#	%	Miles	%	#	%	Miles	%
A - Public Water	10954	30316	2329	21	9150	30	498	5	2098	7	6682	61	11749	39	1445	13	7319	24
B1 - Warm Water Fishery	9986	25466	1131	11	4115	16	955	10	3142	12	6385	64	11049	43	1515	15	7160	28
B2 - Troutwater	971	4856	360	37	1986	41	125	13	766	16	294	30	694	14	192	20	1410	29
C - Contact Recreation	10957	30322	2589	24	10058	33	586	5	2514	8	6698	61	11780	39	1084	10	5970	20
D - Agriculture and Wildlife	10956	30322	3524	32	15407	51	228	2	650	2	6698	61	11780	39	507	5	2485	8
E -Industrial	10957	30322	3524	32	15407	51	227	2	650	2	6698	61	11780	39	508	5	2485	8
Total	**10957**	**30322**																

Table 8 - Summary of the causes for impaired streams

TYPE	CAUSE	SIZE (acres)
Lake	Mercury	12018
Lake	PCBs	9198
Lake	Sedimentation/ Siltation	193
Lake	Trophic State Index	100
Lake	Iron	54
Lake	DO	8
TYPE	**CAUSE**	**SIZE (miles)**
Stream	Fluoride	0.2
Stream	Temperature, water	2.3
Stream	Ammonia	5.4
Stream	Chloride	21.6
Stream	Lead	23.3
Stream	DO	23.4
Stream	Nitrite	30.7
Stream	Low Flow Alterations	44.3
Stream	Manganese	78
Stream	Zinc	92.1
Stream	Selenium	160
Stream	Dioxin	359
Stream	Mercury	669
Stream	Aluminum	937
Stream	PCBs	1056
Stream	pH	1376
Stream	Iron	3958
Stream	Fecal/Bacteria	4255
Stream	Bio-Impairment	5153

Table 9 - Number of miles for the leading causes of West Virginia impaired streams



Probabilistic Data Summary

The probabilistic design used for this report was stratified to ensure adequate coverage across all watersheds and allows the state to characterize overall water quality conditions at the watershed (USGS 8-digit HUC) level in addition to providing statewide estimates of condition. The goal of any probabilistic program is to provide statistically unbiased estimates of stream condition throughout a particular region (i.e., watershed, ecoregion or state) without assessing every single stream mile in that region. This approach can be used to describe various aspects of stream conditions including, the proportion of stream miles with biological impairment, the proportion of stream miles with specific water quality criteria violations, and to characterize the relative importance of stressors such as sedimentation or acid precipitation.

In 2006, West Virginia completed its second 5-year cycle using a sample design that provided data from 750 sites from wadeable streams statewide. The target population for this effort was small to medium sized (1-4th order) wadeable streams. Ninety-eight percent of West Virginia's stream miles are of this size class and approximately 70% of these are wadeable. This level of effort allows for estimations of conditions across the state with a high degree of confidence. The sites are spread across 25 watersheds and watershed groupings (some small watersheds are combined with adjacent ones) and allow estimates of conditions at this scale, but with lesser confidence. Six sites were sampled in each of the 25 watersheds each year, resulting in 30 samples per watershed at the end of the five-year design. While this design does allow for watershed level characterizations following the completion of the cycle, describing these estimates for the more broad classification of Level 3 Ecoregions reduces the uncertainties around the different estimates of condition. Results for this second 5-year effort (2002-2006) have been summarized for this report and are described in terms of Ecoregions.

The sites for this second 5-year effort were selected with slightly different design criteria than the first cycle and problems developed in trying to compare one data set with the other. The first 5-year cycle included more of the larger order streams, which was a result of both the fact that the original target universe included up to 5th order streams and the fact that several watersheds were sampled in drought years that forced assessments into the larger streams because they were the only ones with flows adequate to sample. These differences in approach are most evident when looking at stream characteristics that would be expected to have an upstream / downstream gradient. For example, sedimentation problems often are not evident in headwater streams because the slope of these streams is such that sand and silt don't settle out until its reaches the slower, flatter sections. So, by sampling a higher percentage of headwater steams, it might be expected to see a lower percentage of stream miles with sediment problems. The 3rd 5-year round of probabilistic monitoring was started in 2007 and will allow statistically valid trend analyses to be possible in the future.

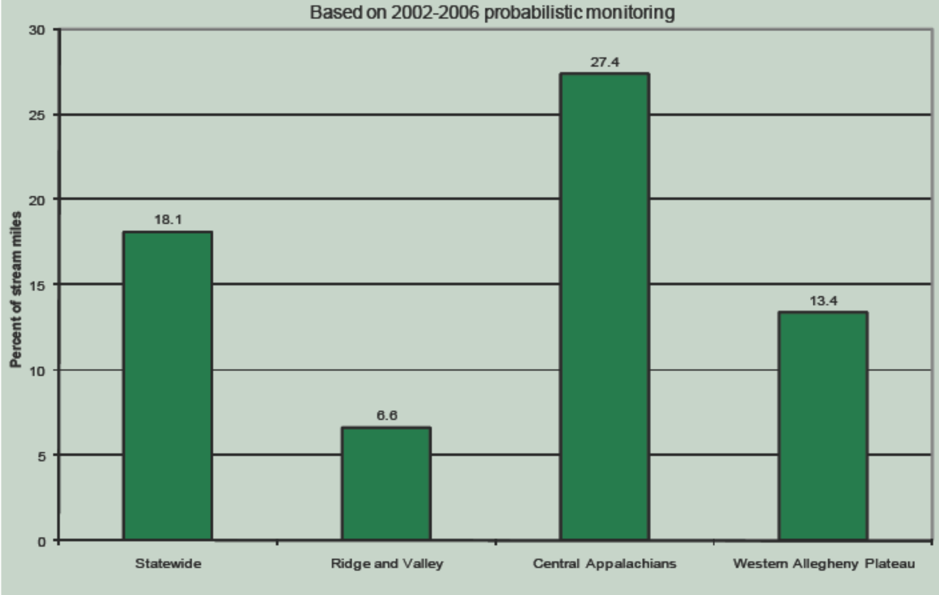
Figure 2– West Virginia's ecoregions map

Mine drainage

Mine drainage streams may be impaired by low pH and/or elevated concentrations of metals, including iron, aluminum, and manganese. Other dissolved ions such as sulfate may also be present in concentrations above ambient levels. A sulfate concentration greater than 50 mg/L was used to identify probabilistic sites influenced by mine drainage. Following this guideline, approximately 18.1% of the stream miles statewide are influenced by mine drainage (Figure 3). Observed on an ecoregional basis, mine drainage influences a greater proportion of stream miles in the coal rich Central Appalachians (Ecoregion 69) than in the Ridge and Valley (Ecoregion 67) or Western Allegheny Plateau (Ecoregion 70). About

27.4% of the stream miles in the Central Appalachians are influenced by mine drainage. Contrastingly, about 6.6% and 13.4% of stream miles are influenced by mine drainage in the Ridge and Valley and Western Allegheny Plateau, respectively.

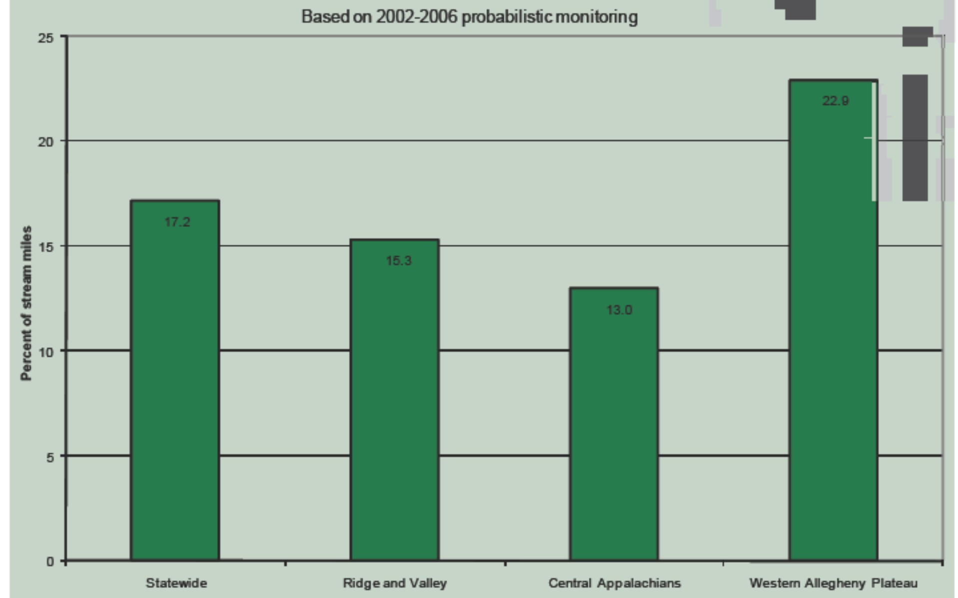
Figure 3 Percent of stream miles influenced by mine drainage - as indicated by elevated sulfate (> 50 mg/L)



Bacterial contamination

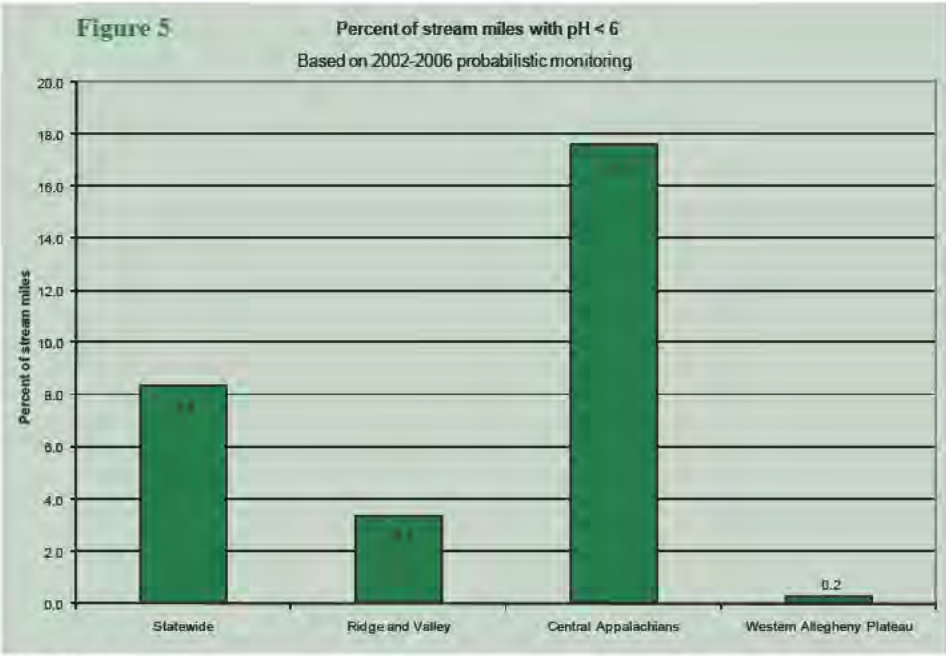
Many West Virginia waters contain elevated levels of fecal coliform bacteria. Contributors to the problem include leaking or overflowing sewage collection systems, illegal homeowner sewage discharges by straight pipes or failing septic systems, and runoff from urban or residential areas and agricultural lands. Based on probabilistic data, about 17.2% of stream miles in the state have fecal coliform bacteria levels that exceed the criterion of 400 colonies/100mL (Figure 4). In general, watersheds in the more developed regions of the state had a greater proportion of stream miles exceeding the criterion. The proportion of stream miles violating the criterion was highest in the Western Allegheny Plateau ecoregion (22.9% of stream miles) and somewhat lower in the Central Appalachians (13.0% of stream miles) and the Ridge and Valley ecoregions (15.3% of stream miles). It should be noted that the probabilistic monitoring is performed at baseflow conditions. Because samples are not collected during storm runoff events, bacteria levels that would likely increase under these higher flow conditions are not accounted for in this assessment.

Figure 4 Percent of stream miles with fecal coliform bacteria > 400 colonies/100 ml



Acidity

The aquatic life communities in the headwater sections of many West Virginia waters continue to be impacted by low pH acidic water quality. The impairment is most prevalent in watersheds with soils of low buffering capacity and most often caused by acid precipitation and less often (but more severely) by acid mine drainage. An evaluation of probabilistic data indicates that approximately 8.4% of the stream miles in the state have pH values below 6.0 (Figure 5). Most of the stream miles identified as impacted by acidic waters are in the Central Appalachians ecoregion, representing 17.6% of the stream miles within this area. Specifically, the Forested Hills and Mountains section of this ecoregion are largely susceptible to acid deposition impacts due to infertile soils and resistant sandstones of the Pottsville group. The Ridge and Valley ecoregion is less susceptible to the impacts of acid deposition with geologic materials such as limestone and shale providing more buffering capacity to neutralize acid precipitation. Nonetheless, probabilistic data indicates that approximately 3.3% of the stream miles in this ecoregion are impacted by acidic conditions. There are almost no stream miles with impacts attributed to acidic conditions in the Western Allegheny Plateau ecoregion. Again, this ecoregion has well buffered soils that limit the impacts of acid precipitation and acid mine drainage.



Habitat quality

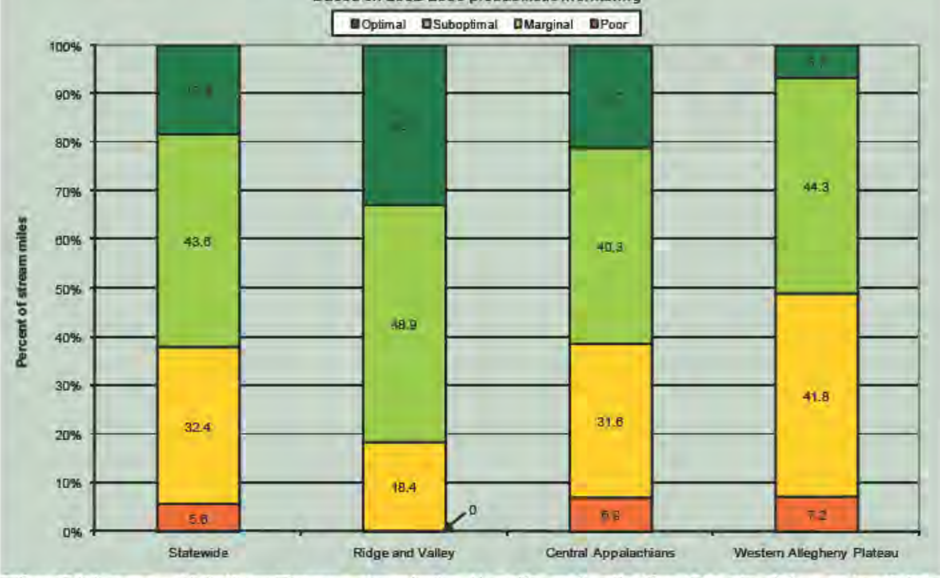
It is nearly impossible to accurately interpret the biological health of streams without measuring various aspects of habitat quality. During the course of probabilistic sampling, DEP personnel collected data on many features of both riparian and instream habitat known to be important to the biological communities of streams. Habitat parameters from U.S. EPA's Rapid Bioassessment Protocol (RBP) were measured. These include measures of the amount of sediment and embeddedness in the stream channel as well as measures of the vegetation along the bank and riparian zone in the stream corridor. Specifically, ten characteristics are scored (0-20) based on their quality and then combined to assess the overall physical habitat condition of the site. The overall scores (Total RBP Habitat) were categorized as good, fair, or poor (Figure 6). Based on probabilistic data, about 21.4% of stream miles have good habitat quality (Total RBP score of 160 or greater), 68.0% of stream miles have fair habitat quality (110–159), and 10.6% of stream miles have poor habitat quality (< 110). While these categorical thresholds are somewhat arbitrary, they do provide a good comparison of one area to another.

The Ridge and Valley and Central Appalachians ecoregions are similar with respect to overall habitat quality. Over 30% of stream miles in each of these ecoregions are of good quality and less than 5% are poor with respect to overall habitat quality. In comparison, habitat quality scores are lower in the Western Allegheny Plateau. The presence of more widespread development and factors such as higher rates of soil erosion in this ecoregion are potential causes for only 3% of its stream miles being rated as good in overall habitat quality. Additionally, the proportion of stream miles with poor habitat quality (20.8%) is substantially higher in this ecoregion. It is important to consider that the greatest proportion (over 75%) of stream miles in the state are in the fair or lower habitat categories. This indicates that most of the state's stream miles have at least some degree of habitat perturbation degradation.

Although DEP may gain insight into overall habitat conditions by combining the individual measures, it is useful to examine specific habitat characteristics. Sedimentation is one of the most important problems facing West Virginia streams. Important sources of increased sedimentation include agricultural activities, mining, logging, oil/gas, roads, urban and suburban development, and removal of stream bank and riparian vegetation. The effects of sediment deposition on stream biota are well known and include interference with respiration and the smothering of physical habitat. The categories used to rate the individual habitat characteristics are labeled as optimal, suboptimal, marginal, and poor (which match the field assessment forms). Sedimentation results for the state as a whole indicate that 5.6% of stream miles are in poor condition, 32.4% stream miles are marginal, 43.6% of stream miles are suboptimal, and 18.4% of stream miles are in optimal condition (Figure 7). As with the overall habitat scores, the widespread impacts of sedimentation in West Virginia are apparent in that over 80% of the wadeable streams miles in the state score less than optimal.

Figure 7 RBP Habitat Parameter 'Sedimentation' Scoring Categories

Based on 2002-2006 probabilistic monitoring



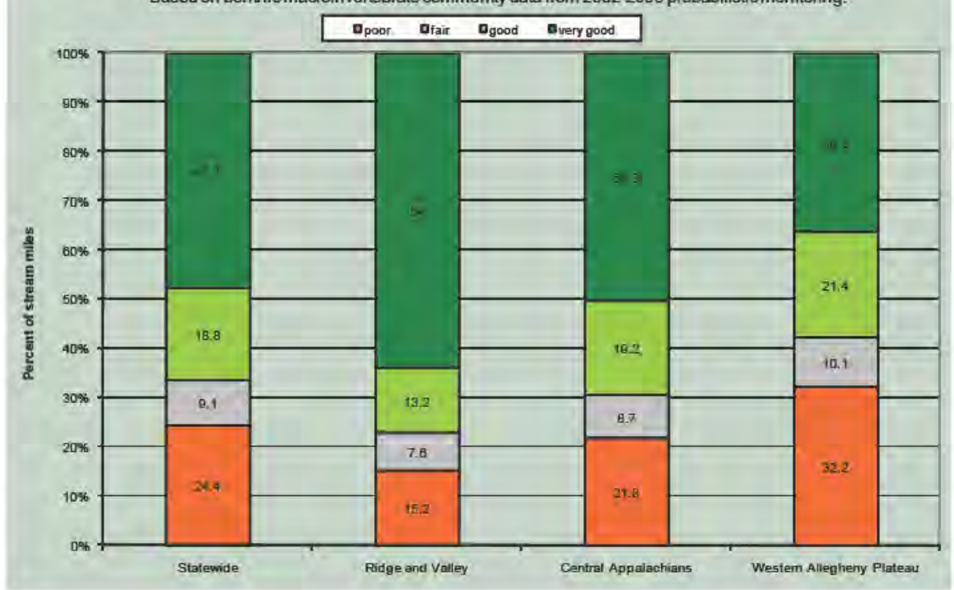
The Ridge and Valley Ecoregion is better than both the Central Appalachian or the Western Allegheny Plateau ecoregions regarding sedimentation. In the Ridge and Valley ecoregion, 32.7% of stream miles are in optimal condition and zero are in poor condition. Results for the Central Appalachians are poorer than the Ridge and Valley ecoregion but better than the Western Allegheny Plateau ecoregion, with 21.2% of stream miles in optimal condition and 6.9% of stream miles in poor condition. The Western Allegheny Plateau continued to show substantial problems in habitat quality. In contrast to the Ridge and Valley, less than 7% of stream miles in this ecoregion are in optimal condition and just under 50% of stream miles are in poor or marginal condition in terms of sedimentation. The presence of more widespread development and higher rates of soil erosion in this ecoregion are potential causes of the observed increase in sedimentation and resultant decrease in habitat quality.

Biological impairment

The biological communities living in West Virginia streams are exposed to many stressors, including toxic contaminants, sedimentation, nutrient enrichment, and acid precipitation. DEP uses benthic macroinvertebrates to assess the biological condition of streams in the state. These organisms provide reliable information on water and habitat quality in streams. They are extremely diverse and exhibit a wide range of tolerances to pollutants. Further, they serve as an excellent tool for measuring overall ecological health, especially when summarized into a single index of biological integrity. In West Virginia, the health of benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams. The WVSCI is composed of six metrics (each measuring a different aspect of the community) that were selected to maximize discrimination between streams with known impairments and reference streams. Based on the WVSCI impairment threshold of 60.6 (0 –100 scale) WVSCI, about 24.4% of wadeable stream miles in the state are in poor condition (i.e. impaired), while 66.5% of stream miles are not impaired and 9.1% are inconclusive (Figure 8). More than 30% (32.2%) of the wadeable stream miles in the Western Allegheny Plateau were impaired. In contrast, the Ridge and Valley and Central Appalachians ecoregions had substantially lower percentages (15.2% and 21.8%, respectively) of wadeable stream miles rated as impaired biologically.' Poorer habitat conditions in the Western

Figure 8 Stream Biological Condition Scoring Categories

Based on benthic macroinvertebrate community data from 2002-2006 probabilistic monitoring.



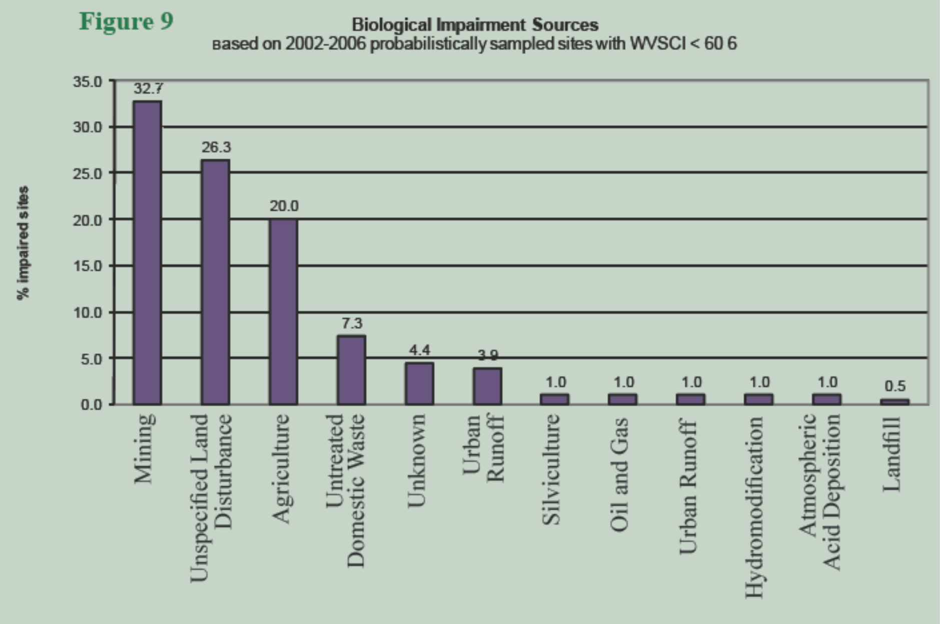
Allegheny Plateau, especially those related to sedimentation, are likely to be at least partially responsible for the higher proportion of stream miles rated as impaired biologically.

Sources of bio-impairment

The results of the 2002-2006 probabilistic sampling revealed that 205 out of 753 samples received a WVSCI score of 60.6 or less. Benthic macroinvertebrate communities that score within this range are considered impaired, and the DEP would describe them as not supporting their aquatic life use designation.

Twelve categories of major sources of biological impairment were determined using water chemistry analyses, narrative descriptions by sampling personnel, benthic community characteristics, and several Geographic Information System data layers depicting landuse activities. Each of the 205 sites was assigned a primary source of impairment from one of the 12 categories. For sites with possibly more than one source of impairment, the most obvious source was listed. Of the 205 bio-impaired sites, mining affected almost 33 percent. The next highest sources of impairment are 'unspecified land disturbance' and agriculture. Unspecified land disturbances are characterized by heavy sand and sedimentation associated with dirt roads, poor riparian zones, and highly eroded areas.

Figure 9



Major Basin Summaries

Guyandotte River

The Guyandotte River is divided into upper and lower sections. The confluence of Island Creek and the Guyandotte River defines the boundary between the Upper and Lower Guyandotte watersheds - The impairments of the Upper Guyandotte River mainstem (fecal coliform, total iron and biological impairment) and the Lower Guyandotte River mainstem (fecal coliform, total iron) are addressed by TMDLs developed by EPA Region III in 2004. In that effort, EPA also developed TMDLs for numerous Guyandotte River tributaries predominantly impaired by mine drainage. Currently, there are 44 streams within the Upper Guyandotte Basin and 52 streams in the Lower Guyandotte Basin which are listed as biologically impaired and in need of TMDLs.

Kanawha River and major tributaries (New, Bluestone, Greenbrier, Gauley, Elk and Coal rivers)

The Kanawha River is divided into two major sections with the break occurring at the mouth of the Elk River. The Upper Kanawha Basin extends upstream to the confluence of the New and Gauley Rivers in Gauley Bridge. The Lower Kanawha Basin begins at the mouth of the Elk River and extends downstream to its confluence with the Ohio River in Point Pleasant.

The entire Kanawha River mainstem, Bluestone River and Bluestone Lake are listed as impaired because of fish consumption advisories related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs).

Fecal coliform impairments have been identified in portions of the Lower Kanawha River mainstem and in all of the major tributaries of the Kanawha River. Affected segments include the New River (mouth to Bluestone Dam), the Elk River (mouth to river mile 27.2), and the entire lengths of the Bluestone, Coal, and Greenbrier Rivers.

Previous EPA TMDL development efforts addressed dioxin impairments of the Lower Kanawha River and tributaries (September 2000) and metals impairments of the Elk River and tributaries (September 2001). The West Virginia Department of Environmental Protection finalized numerous TMDLs for impaired tributaries of the Upper Kanawha River in January 2005. Additionally, DEP developed TMDLs for the Coal River and numerous impaired tributaries that were approved by the EPA in September 2006. DEP also developed numorous TMDLS in the Gauley, New, Greenbrier and Bluestone watersheds in 2008.

Monongahela River and major tributaries (Cheat, Tygart and West Fork rivers)

Between March 2001 and September 2002, EPA developed TMDLs addressing the iron, aluminum, manganese and pH impairments of the Monongahela, Cheat, Tygart and West Fork Rivers and numerous tributary waters.

Fecal coliform impairments have been identified in the Monongahela River (entire length), the Tygart Valley River (entire length), and the West Fork River (mouth to Stonewall Jackson Lake Dam). The same segment of the West Fork River is also biologically impaired, has a dissolved zinc water quality criteria impairment, and a consumption advisory related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs). Additionally, the entire length of the Monongahela River continues to be listed for PCBs. Stonewall Jackson Lake, Cheat Lake and Tygart Lake are all listed as impaired for mercury. Cheat and Tygart Lakes are listed for PCBs. The mercury and PCB listings of these lakes are based on elevated fish tissue concentrations and fish comsumption advisories.

Cheat River Watershed TMDLs

The DEP and the EPA have initiated a large-scale revision of the Cheat River watershed TMDLs that the EPA developed in 2001. At present, pre-TMDL monitoring, impairment assessments, and source tracking and characterization activities have been completed and a work directive issued to perform water quality modeling. This effort is scheduled to be finalized in December 2009. The revision will involve re-evaluation of the metals and pH impairments associated with the 2001 TMDLs, in light of the aluminum and manganese water quality standard revisions that have occurred and the various water quality improvement projects in place throughout the watershed. In addition to the re-evaluation component, the new effort will also develop TMDLs for streams in the watershed where fecal coliform bacteria and/or biological impairments have been identified. It is important to note that the pH water quality conditions of the Cheat River mainstem and Cheat Lake have shown drastic improvement in recent times. The West Virginia Division of Natural Resources' limestone drum station on the Blackwater River and its application of limestone fines to headwater streams impacted by acid rain have restored many miles of trout water and recent pH data at the head of Cheat Lake has consistently indicated no impairment for the last four years. Several AMD restoration projects have also been completed in the watershed.

Little Kanawha River

A small headwater section from river mile 162 upstream to the headwaters is currently listed for pH impairment. The segment of the river from Burnsville Dam (river mile 132.6) downstream to the mouth is impaired by fecal coliform and mercury, due to a fish consumption advisory. Finally, the entire river is now listed for PCB due to a fish consumption advisory.

Previously, EPA developed iron and aluminum TMDLs for the mainstem and several tributaries. The previously developed total aluminum TMDLs are now obsolete due to the criteria revisions that occurred in 2006. In addition, DEP has received approval from EPA for TMDLs on four additional tributaries for total iron, pH and biological impairments.

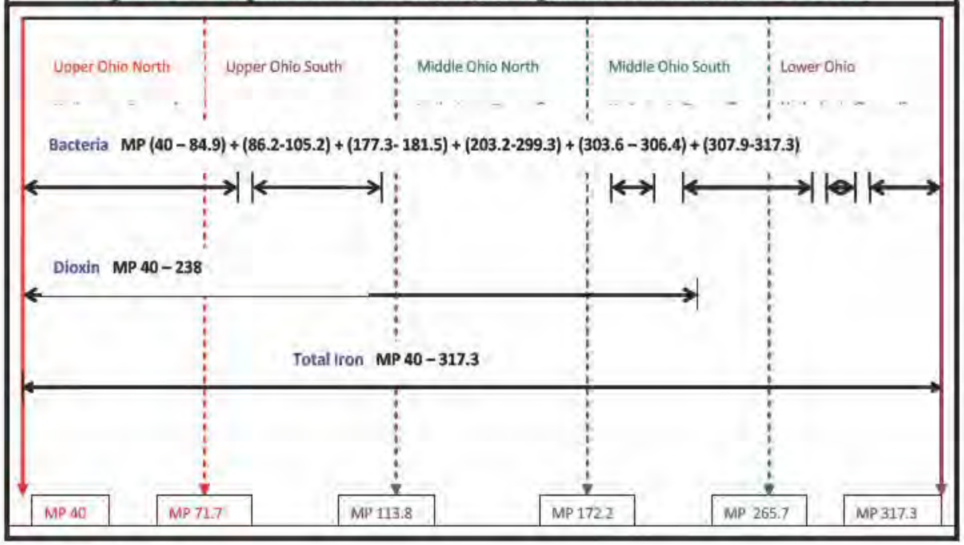
Ohio River

In 2000 and 2002, EPA developed TMDLs for dioxin and PCBs, respectively for the Ohio River mainstem. The EPA TMDLs for dioxin included only sections of the Ohio River from the mouth of the Kanawha River downstream to the Kentucky state line. Additional sections of the river above the Kanawha River remain listed as impaired by dioxin. Currently, TMDLs have been or are being developed to address various impairments on many of the tributary streams.

The Ohio River Valley Water Sanitation Commission does extensive water quality monitoring of the Ohio River annually. In addition, every two years ORSANCO publishes a 305(b) report that provides assessments of the water quality based on ORSANCO water quality standards. As in the past, DEP has reviewed the data and incorporated these assessments into the West Virginia Section 303(d) List.

When both West Virginia and ORSANCO have an established criterion for a particular pollutant the most stringent standard is applied for assessment purposes and included in West Virginia's Section 303(d) List. For example, the bacteria impairment identified for various Ohio River segments is based upon both ORSANCO's E. coli. water quality criteria and West Virginia's fecal coliform criteria. In addition, the river has been identified as iron-impaired based upon the application of West Virginia's warmwater aquatic life criterion of 1.5 mg/l. The following graphic depicts the currently listed segments of the Ohio River bordering West Virginia.

Figure 10 - Impairments of the West Virginia section of the Ohio River



Tug Fork River

In 2002, EPA developed TMDLs for total iron and total aluminum for the Tug Fork River mainstem. In addition, total iron, total aluminum, total manganese and pH TMDLs were developed for its impaired tributaries. As noted earlier, subsequent revisions to the aluminum and manganese criteria have created uncertainty relative to the impairment status of affected waters and, as such, the validity of many the total aluminum and manganese TMDLs.

Currently, the Tug Fork is identified on the 2008 West Virginia Section 303(d) List for violations of the fecal coliform criteria and biological impairment. The fecal coliform impairment extends from the mouth to river mile 35.7 and the biological impairment reaches from river mile 51.6 to the headwaters.

Interstate Water Coordination

Joint PCB monitoring and TMDL development effort with Virginia

DEP has been working with the Virginia Department of Environmental Quality (Va. DEQ) to assess Polychlorinated Biphenyls (PCBs) impairment along the Virginia section of the Bluestone River. As part of a cooperative project, DEP and Va. DEQ placed a number of semi-permeable membrane devices (SPMD) throughout the Bluestone watershed in Virginia and West Virginia. Several SPMDs were placed in streams that are known or suspected to be historical sources of PCBs. DEP and Va. DEQ are working with both the United States Geological Survey (USGS) and Region III EPA on this project. EPA provided the funding through its RARE grant program while USGS supplied the SPMDs and did the analysis of samples. The product of this cooperative will be a TMDL for the Bluestone River and tributaries with loadings and allocated reductions for sources in both Virginia and West Virginia. The USGS report detailing analytical method and sample results can be found at http://pubs.usgs.gov/of/2007/1272/pdf/OFR2007-1272.pdf

Ohio River Valley Water Sanitation Commission – ORSANCO

As with previous reports, DEP's 2008 Integrated Report includes assessments based on data provided by ORSANCO. Throughout the development of ORSANCO's 2008 Biennial Assessment, DEP has been involved with ORSANCO's efforts to standardize assessments among the "compact" states. DEP personnel continue to participate in several standing committees, along with representatives from other Compact states, charged with helping direct ORSANCO's water quality and biological monitoring efforts.

Chesapeake Bay

The Chesapeake Bay is impaired by nutrients and sediment from multiple sources originating locally and in upstreams states. This large and biologically diverse waterbody is an important economic and recreational resource.

The need to restore this waterbody is a high priority for many agencies, organizations and the public in general. Fourteen percent of the West Virginia's waters drain into the Potomac River and on into the Bay. In addition, portions of the James River Watershed in West Virginia contribute flow to the Bay.

In June 2002, Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding and committed West Virginia to the nutrient and sediment load reductions. The West Virginia Potomac Tributary Strategy, developed in November 2005, includes plans for nutrient and sediment reductions from a variety of West Virginia point and nonpoint sources. All other Bay jurisdictions have developed and are implementing similar plans.

Interstate Commission on Potomac River Basin

The Commission is a non-regulatory agency of basin states (Maryland, Pennsylvania, Virginia and West Virginia), Washington, D.C. and the federal government. The Commission promotes watershed-wide solutions to the pollution and water resources challenges facing the basin and its more than 5.3 million residents. Examples of current commission efforts include Chesapeake Bay Program involvement, stream biological assessments, support of selected stream gages, the Potomac Groundwater Assessment, Potomac Basin Drinking Water Source Protection Partnership coordination and Potomac Watershed Toxic Spill Model support. In addition, the Commission's public outreach program supports and helps coordinate an annual watershed-wide clean up effort and produces and distributes 150,000 copies of the newsletter Potomac Basin Reporter. The commissioners are appointed by their respective jurisdictions and provide policy guidance and oversight for a skilled staff of scientists and educators.

Ohio River Basin Commission

The Commission, in its current form, was founded in 1981. The Commission shall be to: (1) provide a forum for Ohio River Basin states to study, discuss, and develop regional policies and positions on common interstate issues concerning water and related land resources; (2) coordinate to the extent possible water and related land resources planning in the Ohio River Basin; (3) provide representation of regional interest to the federal government; (4) investigate, study and review water related problems of the Basin; (5) assist in water and related land resources training for Basin representatives. The Commission welcomes membership from all states draining to the Ohio river including Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.

Gauley River in Fayette County
Photo by Mike Whitman

Total Maximum Daily Load (TMDL) Development Process

From 1997 until 2003, EPA Region III developed West Virginia TMDLs under the settlement of a 1995 lawsuit, Ohio Valley Environmental Coalition, Inc., West Virginia Highlands Conservancy, et. al. v. Browner, et. al. The lawsuit resulted in a consent decree between the plaintiffs and the EPA that specifies TMDL development requirements and compliance dates. While the EPA was working on developing TMDLs, the DEP concentrated on building its own TMDL program. With the help of the TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL section within the Division of Water and Waste Management.

The TMDL section is committed to implementing a TMDL process that reflects the requirements of TMDL regulations, provides for the achievement of water quality standards, and ensures that ample stakeholder participation is achieved in the development and implementation of TMDLs. The DWWM's approach to TMDL development allows 48 months to develop a TMDL from start to finish. This approach enables the agency to carry out an extensive data generation and gathering effort to produce scientifically defensible TMDLs, and allows ample time for modeling, report drafting and frequent public participation opportunities.

The DEP TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year, five-step process. The watersheds are divided into five hydrologic groups (A - E). Each group of watersheds is assessed once every five years. A map depicting the 32 watersheds and hydrologic groupings is provided as an attachment to this document before the List Key. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the NPDES permitting process and efforts toward limiting nonpoint source loading. Throughout the TMDL development process, there are numerous opportunities for public participation and input.

The West Virginia TMDL program must also accomplish TMDL development in accordance with the consent decree between EPA and the Ohio Valley Environmental Coalition, et. al., which requires all streams impaired by mine drainage to have TMDLs developed by September 30, 2009. Each year, the agency selects waters within the targeted hydrologic group where mine drainage TMDL development is mandated by the consent decree. Other geographically proximate impairments are added to those selections until the agency's annual resources for TMDL development are consumed. In this way, statewide TMDL development by regulatory deadlines is efficiently and systematically accomplished. Barring unforeseen circumstances, all consent decree impairments will have TMDLs developed and approved by September 30, 2009.

The 303(d) list identifies and prioritizes the waters and impairments for which TMDLs will be developed over the next four years by specifying the year in the "Projected TMDL Year" column. The impaired waters intended for TMDL development in 2009, 2010, 2011 and 2012 are known and identified on the list. The remaining legacy mine drainage impairments that, per the consent decree, must have TMDLs developed by 2009 are also specified. For other waters and impairments, where the timing of TMDL development is less certain, the "Projected TMDL Year" is identified as the most future year when opportunity exists per the DEP's plans to develop TMDLs in concert with the Watershed Management Framework.

At any point in time, DEP is working on TMDLs in each of the five hydrologic groups (A-E). Each set of TMDLs moves through several stages of development prior to finalization and the EPA's approval. Table 3 shows the state's TMDL development progress.

The DEP's webpage contains all approved TMDL documents and the draft TMDL documents currently out for public comment. These documents can be found at http://www.wvdep.org/wvtmdl.

Water Pollution Control Programs

Division of Mining and Reclamation

The mission of the Division of Mining and Reclamation (DMR) is to regulate the mining industry in accordance with federal and state law. Activities include issuing both National Pollutant Discharge Elimination System and Surface Mining Control and Reclamation Act permits for mineral extraction sites and related facilities, inspecting facilities for compliance, monitoring water quality, tracking ownership and control, and issuing and assessing violations. DMR is responsible for the computer databases that tracks DMR's activities - Environmental Resources Information System and Applicant Violator System the federal database. The Permitting Unit is responsible for reviewing permit applications for surface and underground coal mines, preparation plants, coal loading facilities, haulage ways, and coal-related dams. This unit also reviews permit applications for non-coal quarry operations (sand, gravel, limestone, etc). Permit review teams staffed with geologists, hydrologists, engineers and others are located in each regional office throughout the state and in the headquarters office.

DMR's Inspection and Enforcement unit is responsible for inspecting all coal mining and quarry operations in the state. It enforces compliance through regular inspections and Notices of Violation, and ensures site reclamation through final release of the operation. This unit is also responsible for civil penalty assessments, show cause proceedings, bond forfeiture and collection.

DMR's Program Development unit is responsible for implementing a proactive approach to policy issues, legislation and training. This unit is designed to keep the Division staff current with technological advances and to provide clear direction through development of cogent policy and guidance to meet legal and regulatory requirements. This unit provides regulatory interpretation and support to field offices, develops and updates handbooks and forms, drafts legislation and initiates regulation changes. Other responsibilities of this unit include Small Operators Assistance Program, public relations, including responses to Freedom of Information Act requests, special projects, employee training and research of laws regulations and policy.

Division of Water and Waste Management

The Division of Water and Waste Management's mission is to preserve and enhance West Virginia's watersheds for the benefit and safety of all. DWWM strives to meet its mission through implementation of programs controlling surface and groundwater pollution caused by industrial and municipal discharges as well as oversight of construction, operation and closure of hazardous and solid waste and underground storage tank sites. In addition, the division works to protect, restore and enhance the state's watersheds through comprehensive watershed assessments, groundwater monitoring, wetlands preservation, inspection and enforcement of hazardous and solid waste disposal and proper operation of underground storage tanks.

In January 2006, Environmental Enforcement became a branch of the Division of Water and Waste Management. Environmental Enforcement promotes compliance with the Solid Waste Management Act, Water Pollution Control Act, Groundwater Protection Act, Hazardous Waste Management Act, Underground Storage Tank Act, and Dam Safety Act by providing assistance, inspecting regulated sites, and enforcing conditions required by these acts.

National Pollution Discharge Elimination System (NPDES) Program

The DWWM's primary mechanism for controlling point sources is the West Virginia NPDES permitting program. This program, administered by the Permitting Branch, regulates activities and facilities involved in the installation, construction, modification, and operation and maintenance of wastewater treatment systems as well as their discharges. Individual and general permits are used to implement the program. Most permits include effluent limits and requirements for facility operation and maintenance, discharge monitoring and reporting. Other permits require the installation and implementation of best management practices in lieu of effluent limitations and discharge monitoring requirements.

The Permitting Branch also administers a pretreatment program in conjunction with the NPDES program, which outlines procedures for regulating proposed industrial wastewater connections to publicly owned treatment works. The program imposes discharge limitations for indirect discharges and requires the installation of pretreatment facilities where necessary to prevent interference with POTW operations and sludge disposal practices and to ensure that the pollutants contributed by industrial users do not pass through the POTW and violate water quality standards. The National Combined Sewer Overflow (CSO) Policy is implemented as a component of the NPDES Permits for POTWs with CSOs. Other activities administered by the Permitting Branch include the regulation of industrial solid waste landfills and the land application of sewage sludge, and developing wasteload allocations for new or expanding sewage treatment facilities.

In addition to permitting, compliance assessment and enforcement activities are coordinated between the Permitting Branch and Environmental Enforcement. Noncompliance is initially addressed by administrative actions to compel compliance. These may include warning letters, notices to comply, enforcement orders, or referrals for civil action.

Below is a list of permit actions for the time period beginning in July 2005 and ending in June 2007.

Figure 11 - Permit action report

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
Report Date 04/16/2008

NPDES PERMITTING - PERMIT ACTION REPORT (7/1/2005 - 6/30/2007)

	Applications Received This Period	Applications Denied this Period	Permits Registrations and Modifications Issued This Period	Permits Registrations and Modifications Issued Year-to-Date for Current Fiscal 2008	Withdrawn and Voided This Period	Applications Pending as of 6/30/2007: Greater Than 180 dep days	Less Than, 180, > 90 dep days	Less Than, Equal to 90 dep days	Total (dep days)	Greater Than 180 total days	Average DEP Time to Issue Permits This Period (In Days)	Average Total Time to Issue Permits This Period (In Days)
INDIVIDUAL PERMITS	[illegible]	1	[illegible]	86	10	16	14	27	57	[illegible]	131	[illegible]
GENERAL PERMITS												
Home Aeration Units	[illegible]		[illegible]	285	[illegible]	0	0	125	[illegible]	[illegible]	[illegible]	[illegible]
Sewage General	[illegible]	[illegible]	[illegible]	12	1	0	0	14	[illegible]	[illegible]	[illegible]	[illegible]
Storm Water Construction	[illegible]	[illegible]	[illegible]	474	[illegible]	0	1	68	[illegible]	[illegible]	[illegible]	[illegible]
All Others	[illegible]	[illegible]	[illegible]	144	[illegible]	0	2	47	[illegible]	[illegible]	[illegible]	[illegible]
MODIFICATION PERMITS	[illegible]	4	[illegible]	172	[illegible]	10	8	57	[illegible]	[illegible]	[illegible]	[illegible]
TRANSFER PERMITS	[illegible]	[illegible]	[illegible]	151	[illegible]	2	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL - PERMITS	[illegible]	[illegible]	[illegible]	1304	[illegible]	28	24	363	[illegible]	[illegible]		

NOTE: The permits used to calculate for the "Average DEP Time" column are those that were submitted after June 30, 1999, when ERIS was deployed for Division of Water and Waste Management.

Clean Waters State Revolving Fund Program

Clean Water State Revolving Fund (CWSRF) program is a funding program administered by the State Revolving Fund Branch to address water quality problems through wastewater facility construction, upgrades, or expansions. The branch is charged with general oversight, fiscal management and administrative compliance review of local governmental entities that receive funds and provides information and guidance on what administrative actions are needed to process a loan through the program. When a community has been recommended by the West Virginia Infrastructure and Jobs Development Council to seek the CWSRF program for financial assistance, that community will be contacted by a financial manager. A meeting may be scheduled to advise the community leaders about the overall program requirements and specifically what they should do next to obtain a CWSRF loan. There are federal, state, and program requirements that must be met prior to scheduling a loan closing.

The CWSRF currently has three financial assistance programs available. These programs are described below.

Low Interest Loan Program

A low interest loan program for construction of municipal wastewater treatment works is available for municipalities and public service districts to build, upgrade, or expand treatment facilities and collection systems. Conventional loans with a repayment period of 20 years are available with an interest rate and annual administrative fee not exceeding 3% for certain communities. Loans with repayment periods from 21 to 40 years are available for disadvantaged communities where financial affordability is an issue. The interest rate and annual administration fee on these loans do not exceed 1/2%. From July 2005 through June 2007, twenty-two wastewater treatment facility loans totaling $102,274,781 dollars were funded.

Agriculture Water Quality Loan Program

The Agriculture Water Quality Loan Program is a partnership with the West Virginia Conservation Agency developed to address pollution from nonpoint sources using Best Management Practices approved by the U.S. Environmental Protection Agency. CWSRF money is loaned to participating banks so they can offer below market rate low interest loans to qualifying applicants. For more information, contact your local Conservation District office, http://www.wvca.us/directory/cdo.cfm. From July 2005 through June 2007, 46 nonpoint source agriculture BMP loans totaling $1,079,287 dollars were funded.

Onsite Systems Loan Program

In cooperation with the West Virginia Housing Development Fund, a new low interest loan program has been established to address onsite sewage disposal problems. Called the “Onsite Systems Loan Program,” loans up to $10,000 are available to replace malfunctioning septic systems and to install new onsite sewage systems for homes that have direct sewage discharges to ditches and streams.

Nonpoint Source Control Program

Many of the streams being listed on the state’s list of impaired waters are affected by nonpoint sources. The majority of the Total Maximum Daily Loads (TMDLs) being developed involve nonpoint source water quality impacts. To more effectively respond to TMDL implementation needs, the Nonpoint Source Management Plan was updated in 2000 to incorporate watershed management principles, including integration of TMDL and Watershed Management Framework scheduling. Since then, the Nonpoint Source Program has developed 16 watershed based plans that address a variety of nonpoint sources of pollution. These plans are developed in cooperation with the stakeholders, including federal, state and local government agencies, within the watershed. As a result of these plans, numerous nonpoint source remediation projects for acid mine drainage, agriculture, streambank erosion, and dirt roads have been undertaken. The goal of the watershed based plans is to restore the impaired streams to meet water quality standards. The successes to date emphasize the need to focus more resources on voluntary installation of best management practices in identified priority watersheds where local stakeholders are interested in making a difference.

The Nonpoint Source Control Program focuses on restoration and protection of streams from nonpoint source pollution. The Program assesses nonpoint source impacts, then develops and implements watershed based plans and projects designed to reduce pollutant loads from agricultural, silviciculture, resource extraction, urban runoff, construction activities, and failing septic systems. Program initiatives are based upon education, technical assistance, financial incentives, demonstration projects, and enforcement, as necessary. The division’s Nonpoint Source Program supports overall administration and coordination of the nonpoint source activities through these participating state agencies: the West Virginia Conservation Agency, the Office of Oil and Gas, and the Division of Health and Human Resources. Each year, specific activities are funded under the Nonpoint Source Program.

Groundwater Program

Under the Groundwater Protection Act, West Virginia Code Chapter 22,

Eroded stream bank along Little Fivemile Creek in Mason County
Photo by Andrew Johnson

Article 12, Section 6.a.3, DEP is required to provide a biennial report to the Legislature on the status of the state's groundwater and groundwater management program, including detailed reports for each agency that has groundwater regulatory responsibility. The current biennial report to the Legislature covers the period from July 1, 2005 through June 30, 2007. This is the eighth report completed since the passage of the act in 1991. Copies of the report "Groundwater Programs and Activities: Biennial Report to the West Virginia 2008 Legislature" may be obtained by contacting the Groundwater Program at the Division of Water and Waste Management, 601 57th St., Charleston, WV 25304. The report also may be reviewed at http://www.wvdep.org/Docs/14320_2008_106_Report.pdf

The Groundwater Program is responsible for compiling and editing information submitted for the biennial report. The DEP, the West Virginia Department of Agriculture and the West Virginia Department of Health and Human Resources all have groundwater regulatory responsibility and contribute to the report. These state boards and six standing committees currently share the responsibility of developing and implementing rules, policies and procedures for the Ground Water Protection Act (1991). The Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Nonpoint Source Coordinating Committee are the standing committees. The report provides a concise, thorough overview of those programs that are charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia.

The Ambient Groundwater Quality Monitoring Network was established by the DWWM in cooperation with the USGS in 1992 and is an ongoing project. The network provides critical data needed for proper management of West Virginia's groundwater resources. The major objective of this USGS study is to assess the ambient groundwater quality of major systems (geologic units) within West Virginia and to characterize the individual systems. Characterization of the quality of water from the major systems helps to:

- Determine which water quality constituents are problems within the state
- Determine which systems have potential water quality problems
- Assess the severity of water quality problems in respective systems
- Prioritize these concerns

Only by documenting present ambient groundwater quality of the state's major systems can regulatory agencies assess whether water quality degradation has occurred in certain areas and whether potential degradation is a result of natural processes or those associated with human activity. Spatial variability in water quality is determined for specific geologic units based on sampling of approximately 30 wells annually. The sampling continues over a period of approximately six years and provides a database of more than 200 wells from which comprehensive water samples are collected. Wells are selected in specific drainage basins in given years, rotating annually to new basins, thus providing sampling of groundwater in all watersheds of the state over the five year period. Then, the cycle of sampling begins again. All associated groundwater quality data for each well sampled and summaries of groundwater quality for each respective watershed are published in the USGS Water Resources Data for West Virginia annual report.

Public Participation and Responsiveness Summary

The draft Section 303(d) List was advertised for public comment from March 24, 2008 through June 6, 2008. This period included a 30-day extension granted by the agency after requests for additional time to fully develop comment submissions were received from multiple entities. Notices of the availability of the draft document were placed in newspapers statewide, including requests for public comment. The draft document was promoted via news release, e-mail and the Internet. At the conclusion of the public comment period, DEP considered all comments and made adjustments to the list where appropriate.

Table 10 identifies all entities that provided comments. All comments have been compiled and responded to in this responsiveness summary. The DEP appreciates the efforts commenters have put forth to improve West Virginia's listing and TMDL development processes. Comments and comment summaries are bold and italicized. Agency responses appear in plain text.

Table 10 - 2008 Section 303(d) List Commenters

Argus Energy WV, LLC	McDowell County Wastewater Treatment Coalition
Appalachian Center for the Econonmy and the Environment	Mettiki Coal (WV), LLC
Consol Energy Inc.	R.E.I Consultants, Incorporated
Fola Coal Company, LLC	West Virginia Coal Association
Massey Coal Services, Inc.	

The classification of the entire length of Beaver Creek (WVMC-60-D-5) as a trout stream was disputed and the removal of iron (trout) and aluminum (trout) impairment listings was requested.

The commenter correctly stated that available water quality monitoring data for Beaver Creek does not indicate impairment pursuant to iron and aluminum criteria for warmwater fisheries and that the classification of Beaver Creek as a trout stream was based upon a non-agency, 2002 fisheries evaluation in the Beaver Creek watershed that found one adult brook trout at one Beaver Creek headwater location and no trout at two other downstream Beaver Creek locations.

Beaver Creek is located in an area of the state where unimpaired streams would be expected to support a coldwater fishery and trout. Beaver Creek is tributary to Blackwater River, which is a trout stream and the fisheries evaluation also documented the presence of brook trout in some of its tributaries. Those facts notwithstanding, Beaver Creek is subject to anthropogenic impacts, particularly those related to acid mine drainage, that jeopardize its ability to support trout.

DEP applies the trout water designated use and associated criteria to specific streams that meet the definition of "Trout waters" at 47CSR2 – 2.19:

"Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.

Alternatively, a stream that currently does not support year-round trout populations may also be properly classified as a trout water if that use was documented to be an existing use pursuant to the definition of "Existing uses" at 47CSR2 – 2.6 and the Tier 1 protection requirements of the Antidegradation Policy at 47CSR 2 – 4.1.a:

(2.6) "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included in the water quality standards.

(4.1.a.) Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.

When classifying trout waters, DEP relies heavily on the guidance of the Division of Natural Resources.

After receipt of the comment, DEP reviewed available documentation and consulted with the Division of Natural Resources. Both agencies agree that Beaver Creek was historically a trout stream, but available information is insufficient to classify the present condition of Beaver Creek as a trout stream pursuant to 47CSR2 – 2.19. Also, the lack of historical DNR trout surveys and uncertainty regarding the timing of the degradation of the use preclude evaluation of the existing use provisions of the Antidegradation Policy. As such, DEP has decided to consider the entire length of Beaver

Creek as a warmwater fishery for 303(d) and 305(b) evaluations in the 2008 cycle, and the trout water iron and aluminum impairments were removed from the Section 303(d) list. The aquatic life use classification of Beaver Creek may be revisited in future cycles if new information becomes available.

A compilation of industry-generated, stream monitoring data was provided for specific streams with a request to list selenium impairments.

The submitted data was qualified and evaluated, and the following impairments have been added to the West Virginia 2008 Section 303(d) List:

Stream Name	Code	Impairment	Impaired Reach
Sandlick Creek	WVBST-109	Selenium AQ	Entire Length
Left Fork/Right Fork/ Trace Fork	WVBST-24-K-4-A	Selenium AQ, HH*	Entire Length
Tenmile Fork	WVK-61-L	Selenium AQ, HH*	Entire Length
UNT/Tenmile Fork RM 3.98	WVK-61-L-4	Selenium AQ, HH*	Entire Length
Hughes Creek	WVK-66	Selenium AQ, HH*	Entire Length
Sixmile Hollow	WVK-66-D	Selenium AQ, HH*	Entire Length
Smithers Creek	WVK-72	Selenium AQ, HH*	Mouth to RM 5.6
Rockhouse Creek	WVKC-47-A	Selenium AQ, HH*	Entire Length

**Available water quality data indicates exeedence of the currently effective, 20 (ug/L), selenium criterion for the public water supply use. The 2008 Legislature revised that criterion to 50 (ug/L), but the revision has not yet been approved by EPA and, therefore, is not effective for Clean Water Act purposes. Upon EPA approval, available selenium water quality data will be reevaluated with respect to the public water supply use and impairment decisions will be modified as appropriate in the next listing cycle.*

Bacteria water quality data was submitted that requested the listing of fecal coliform impairments of specific streams in the Tug Fork River watershed.

The submitted data was qualified and evaluated and the following impairments have been added to the West Virginia 2008 Section 303(d) List:

Stream Name	Code	Impairment	Impaired Reach
Tug Fork (revised reach)	WVBST	Fecal Coliform	Entire Length
Dry Fork	WVBST-70	Fecal Coliform	Entire Length
Bradshaw Creek	WVBST-70-M	Fecal Coliform	Entire Length
Little Slate Creek	WVBST-70-N	Fecal Coliform	Entire Length
Clear Fork	WVBST-76	Fecal Coliform	Entire Length
Davy Branch	WVBST-85	Fecal Coliform	Entire Length
Trail Fork	WVBST-98-B	Fecal Coliform	Entire Length

The use of the West Virginia Stream Condition Index (WVSCI) in the assessment of impairment relative to aquatic life designated uses was protested. Commenters contended that the WVSCI is an inappropriate assessment mechanism because it has not been promulgated as a water quality standard by the West Virginia Legislature and has not been subjected to peer-review or public notice and comment.

The basis for biological impairment listings is the narrative water quality criterion at Title 47 Series 2 Section 3.2.i of the Code of State Rules, which prohibits significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. This narrative criterion is a valid water quality standard that was promulgated by the West Virginia Legislature and approved by the EPA.

Under the Clean Water Act and implementing regulations, DEP must assess State waters with respect to attainment of water quality standards via comparison of available information to both numeric and narrative water quality criteria. DEP initiated biological integrity assessments in the 1998 Section 303(d) list. The WVSCI was first used in the 2002 Section 303(d) listing process and has remained as an integral component of all subsequent 303(d) lists. The DEP's position has not changed relative to its responsibility to list waters where available data indicates significant adverse impact to their biological components. Furthermore, list approval by the EPA is expected to be contingent upon our continued implementation of this practice.

The WVSCI was specifically designed to accomplish assessment with respect to the 47CSR2 - 3.2.i criterion and remains the best scientific tool available to DEP for that purpose. It was developed for EPA and DEP by national experts in the assessment of biological integrity through the evaluation of benthic macroinvertebrate communities. It is similar to the multi-metric indices used by many states and its component metrics are both validated and widely used nationally when assessing biologic health of aquatic systems.

Over the long period of WVSCI application, there have been numerous opportunities for public notice and comment. Prior to the 2008 effort, the WVSCI has been applied in three West Virginia Section 303(d) lists and each of those processes included public notice and comment provisions. Previous Section 303(d) lists have generated public comments relative to biological impairment and application of the WVSCI. DEP conscientiously considered and responded to all such comments. EPA reviewed public comments and DEP responses and, in their list approvals, concluded that DEP properly assessed biological data and properly considered and responded to public comments.

Certain comments proclaimed that the Division of Water and Waste Management is being disingenuous in its assessment of the biological integrity of state waters to "inflate the list as much as possible to present a perception as the 'sky is falling' in regards to the quality of West Virginia streams and rivers," to "generate more money for future TMDL projects" and to "specifically target mining operations."

DEP does not agree with the above assertions. The current list reflects DEP's responsibility under the Clean Water Act to objectively assess use attainment in West Virginia waters. The biological assessment methodologies associated with the 2008 effort are essentially the same as those used in the preparation of 303(d) lists over the past ten years. In the very limited instances where the source of biological impairment was identified as "mining," source determinations were made through consideration of scientific information generated in TMDL development processes.

Flaws in WVSCI development were suggested regarding metric variability, failure to use a statewide dataset, lack of a sensitivity evaluation in metric selection, and an improper mechanism to select reference and impaired sites.

WVSCI was developed following the procedures outlined in the EPA guidance manual, Rapid Bioassessment Protocols for Use in Wadable Streams and Rivers (EPA 841-B-99-002). It included a determination of the metrics that best discriminated between reference and stressed benthic communities (determined abiotically). These metrics were reduced down to six distinct metrics so that the variability of metrics is minimized. DEP revised the best standard values for each of the six metrics in 2001 after collecting benthic macroinvertebrate data from throughout the state. Evaluation of sensitivity was addressed by selecting those metrics with the highest discrimination efficiencies (i.e., those that are most sensitive to stressors). The reference and stressed streams were selected based on several abiotic criteria, resulting in groups of benthic communities that would be expected to have different characteristics. It would be inappropriate to use data from all streams in the metric selection process. However, all data was used in determining best standard values for scoring individual metrics.

It was suggested that DEP should not use a single biological sampling event at a single sampling location to assess the biological integrity of an entire stream reach, because biological communities are subject to substantial variability and a single sampling event may reflect a recent drought, a scouring flood, or localized impact. An alternative methodology that incorporates multiple collections and consideration of the magnitude and frequency of exceedances was suggested.

Given the magnitude of the DEP's responsibilities for watershed assessment, it would not be practical to demand multiple biological monitoring events at a single location prior to assessment. The design of the WVSCI allows an individual sample, qualified as comparable per its methodology, to discriminate departure from the reference condition and to be used for impairment decisions pursuant to the narrative criterion of 47CSR 2 - 3.2.i.

The DEP does not conduct a biological assessment when suspect conditions jeopardize the validity of assessment under the WVSCI. For example, if it is known that streams have been dry for extended periods or have been scoured by a recent flood, the DEP does not perform biological monitoring. Additionally, to be considered comparable, the depth of sample areas cannot be greater than the height of the net and the flow must be sufficient to carry dislodged macroinvertebrates into the net. All biological monitoring data is extensively screened for comparability to WVSCI thresholds before it is used.

In many instances, multiple biological assessments at varying points along a stream's continuum are not available. In streams with severely limited assessment locations, DEP assumes the biological condition measured at a specific location is maintained in both upstream and downstream directions until contradicted by another measurement. "Entire length" is the default segment for an impairment determined by a single assessment at a single location, but segmentation does occur when a sufficient number of samples sites are available and the data provide a clear distinction between impaired and non-impaired segments.

TMDL development for biological impairment is preceded by an intensified monitoring and source assessment effort, under which biological condition is reevaluated and information necessary to refine impaired reaches and identify stressors and thresholds is generated. Previous biological listings without specification of stressors or sources have not directly impacted permitted facilities, and pollutant reductions have been directed only after causative sources have been determined and TMDLs have been developed, and only for sources that contribute pollutants associated with identified biological stressors.

Benthic macroinvertebrate data for streams in the East Fork of Twelvepole Creek watershed were provided with requests that the data be deemed accurate and valid, and that the data be accepted by DEP and considered in listing decisions, particularly in the segmentation of biologically impaired waters. Additionally, the commenter requested that DEP accept the validity and accuracy of the WVSCI score as calculated from rarefied, whole kick-net samples with equal credence as the WVSCI calculated from 200-organism count kick-net subsamples.

DEP performed an initial review of the submitted data and then arranged and conducted a field visit with the commenter to evaluate sampling methodology and the suitability of sampling locations. DEP also requested and received specific benthic macroinvertebrate collections to evaluate the proficiency of the commenter's taxonomic identification.

In general, appropriate riffle/run habitats were observed at the field-reviewed sampling locations. The commenter's descriptions of field sampling, laboratory sorting and sub-sampling methodologies were consistent with the WVSCI protocols for the most-recent collections (October 2007). Sampling methodology prior to October 2007 was described as a "whole kick" sample from which all benthic macroinvertebrates were identified; assemblages generated under this methodology required rarefication to be comparable to the WVSCI index. Concern was noted with the commenter's October 2007 sampling. The described practice of benthic collection after a period of extended drought would not provide WVSCI comparable assemblages if stream channels were dry for a two-to-three month period prior to collection.

In DEP's pursuit of taxonomic identification validation, the agency was advised by the data provider that the submitted assemblages were not saved in a manner appropriate for re-evaluation. As such, validation was procluded and the data was not used in the impairment assessemnts for the 2008 303(d) List. The provider committed to improve quality assurance and quality control procedures for sampling, sorting, identification and storage of benthic macroinvertabrate samples that would allow data to be used in future assessment cycles. DEP will work with the provider in that regard and is agreeable to joint assessment activities in the subject streams and watersheds.

A second commenter provided the same benthic macroinvertebrate data, but requested the delisting of the following biologically impaired streams: East Fork Twelvepole Creek (RM 4.4 to RM 10.5), East Fork Twelvepole Creek (RM 25.1 to HW), Kiah Creek, Right Fork Cub Branch, Copley Trace Branch, Honey Branch, Parker Branch, Rollem Fork.

The requests were based upon general arguments that the use of the WVSCI is inappropriate and that insufficient data exists to assess biological impairment, and included one or more of the following points:

➊ ***Impairment decisions should not be based upon old assessments.***

➋ ***The WVSCI methodology should not be applied downstream of ponds or lakes because the impairment may be caused by the impoundment (and not by a pollutant).***

➌***The WVSCI methodology should not be applied to previously mined areas or to shortened stream segments below valley fills.***

❹ ***Impairment determinations should not be made based upon a single assessment, because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment" and because of the high spatial and temporal variability demonstrated in the commenter's dataset.***

Some of the subject biological impairment listings had assessments performed by DEP in calendar year 2000 and were first listed on the 2002 Section 303(d) list. The ages of the assessments are recognized, but the subject impairments were promptly listed on the next Section 303(d) list after assessment results became available. New data demonstrating non-impaired conditions is not available. EPA closely evaluates the removal of waters from the 303(d) list without TMDL development. Excluding extenuating circumstances such as a criterion change or a determination that the original listing was made in error, delisting is approvable only where new information demonstrates attainment of water quality standards. TMDL development is preceded by a comprehensive water quality and biological monitoring effort. If new monitoring indicates that a stream is not impaired, then TMDL development will not be initiated and the new data will be used to support delisting of the impairment in the next available Section 303(d) List.

For some of the waters for which delisting was requested, a component of the argument involved the presence of impoundments in the watershed and an implication that the observed biological impairments might be caused by the impoundment rather than by pollutants in the water. DEP recognizes that impairments that are not caused by a pollutant need not be included on the Section 303(d) list. In the Integrated Report format, such impairments can be placed in Category 4C rather than Category 5. Applicable EPA guidance states that waters should be listed in relation to biological assessments unless the state can demonstrate that non-pollutant stressors ***cause*** the impairment or that ***no*** pollutant(s) causes or contributes to the impairment. While DEP accepts that the upstream habitat alteration associated with impoundments might negatively impact downstream biological scores, seldom is there sufficient information to properly discern the causative stressors at the time of assessment and listing. Uncertainty of the causative source of biological impairment at the time of assessment, as is most often the case, is not a sufficient reason to exclude the impairment from the 303(d) list. Consistent with EPA guidance, DEP lists waters as biologically impaired if available monitoring results fall below the WVSCI threshold. Causative stressors are identified at the front end of the TMDL development process. If the stressor identification process determines that a pollutant does not cause the impairment, then a TMDL will not be developed. In regard to this issue, the methodologies employed in the 2008 process are identical to those approved in the three previous 303(d) lists.

The commenter suggested the WVSCI methodology should not be applied to previously mined areas or to shortened stream segments below valley fills. Assessment of the 47CSR2-3.2.i criterion via the WVSCI methodology is appropriate in wadable waters of the state, provided that a comparable riffle/run habitat is available. The narrative criterion is equally applicable as the numeric water quality criteria that drive "criteria end-of-pipe" permit limitations in the discharges from instream treatment structures. There is no mechanism to remove water quality standard applicability in streams "on previously mined and permitted areas" or in stream reaches downstream of valley fills or sediment control ponds.

The commenter also contends that biological impairment determinations should not be made based upon a single assessment because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment" and because of the high spatial and temporal variability demonstrated in the commenter's dataset. WVSCI variability has been measured and addressed in the listing methodology. Duplicate sampling (2 samples collected at the same location and time) has been a routine component of DEP's biological monitoring program since the initiation of WVSCI implementation. The observed variability forms the basis for a precision estimate that, in turn, creates the "gray zone" concept that is applied in the listing methodology for biological impairment. Streams with WVSCI scores falling below the true impairment threshold of 68 (5th percentile of reference) and above 60.6 (5th percentile of reference minus the precision estimate) are not initially listed but are targeted for re-evaluation. Because a gray zone WVSCI result does not provide sufficient information for classification of aquatic life use attainment, DEP also does not interpret it as a demonstration of improved biological condition in delisting decision-making.

Temporal variability of WVSCI reference sites has also been evaluated. Multiple biological resampling events have been performed at reference stations. The unchanged watershed conditions and consistent WVSCI scores demonstrate acceptable variability and reproducibility of the WVSCI methodology. Conversely, WVSCI temporal variability cannot be effectively assessed in disturbed watersheds without specific knowledge of changing watershed activities that may impact biological condition.

As described in the response to the previous comment, the commenter's submitted dataset could not be validated. As such, the purported, extreme WVSCI variability cannot be substantiated with the data submitted.

DEP maintains that the WVSCI protocol for assessment of the 47CSR2-3.2.i criterion is scientifically sound and that the arguments presented by the commenter do not support its abandonment.

A request was received to revise the impaired reach of Rollem Fork (WVO-2-Q-18-E) because of the presence of instream ponds in the watershed.
A field investigation of Rollem Fork confirmed the presence of the first instream pond at approximate mile point 0.9. As such, the biological impairment indicated by the benthic macroinvertebrate collection near the mouth of Rollem Fork was considered to be representative of the stream segment between the mouth and milepoint 0.9. The impaired reach of Rollem Fork was revised from 1.9 miles to 0.9 miles in the Section 303(d) list.

A request was received to delist the biological impairment for Open Fork (WVO-2-Q-27). A previous biological assessment indicated an unimpaired condition near the mouth of the stream, whereas a new assessment at mile point 0.9 indicated impairment. DEP was advised that the more recent assessment location appears to be within a sediment pond such that the collected assemblage is not comparable to the WVSCI.
The more recent biological assessment of Open Fork was conducted under the probabilistic monitoring program. Under that program design, specific sampling sites are selected randomly by computer. To maintain program integrity, pre-selected sites are not relocated in the field. After receipt of the comment and evaluation, DEP concurs that the sampling location is located immediately upstream of a pond and could have been periodically inundated with backwater prior to sample collection. As such, uncertainty exists regarding the comparability of the collected assemblage and the impairment was removed from the Section 303(d) list.

Delisting of the manganese impairment of Kiah Creek (WVO-2-Q-18) was requested. The commenter stated that most of the observed manganese exceedances in the dataset upon which the listing decision was based occurred in 2003, and very low level exceedances were reported on 10/1/04 and 8/21/06. An anomaly associated with the specific conductance value reported for the 8/21/06 sampling event was identified and, due to that anomaly, the validity of the overall dataset was questioned. The commenter also provided additional manganese water quality data collected in Kiah Creek at approximate milepoint 3.1 that indicates a non-impaired condition.
The water quality data available for the original assessment was that which was generated by the Division of Mining and Reclamation in the "Trend Station" monitoring program. The zone of applicability of the manganese criterion in Kiah Creek is from the mouth upstream 3.3 miles. The trend station is located 0.6 miles upstream of the mouth. The original assessment and listing conformed with the listing methodology in that greater than 10% of the available manganese results (6/51) exceeded the criterion value over the data evaluation period associated with the 2008 effort (July 1, 2002 – June 30, 2007).

Upon receipt of the comment, DEP specifically re-evaluated the August 21, 2006 Trend Station analytical results but could not conclude that the low specific conductance reported for that date should disqualify the measured manganese concentration. DEP evaluated and accepted the commenter's additional manganese data collected at milepoint 3.1. Furthermore, DEP determined that no additional manganese sources are present in the Kiah Creek watershed downstream of milepoint 3.1 and that the manganese concentrations in Kiah Creek should not differ appreciably between the commenter's sampling location and that of the Trend Station. The newly submitted data was combined with that from the Trend Station and reassessed. The recalculated exceedance rate did not meet the impairment threshold of the listing methodology and a Kiah Creek manganese impairment was not included on the Section 303(d) list.

One commenter provided references to the Programmatic Environmental Impact Statement for Mountaintop Mining and Valley Fills in Appalachia (MTM/VF EIS), a supplemental study supplied by a member of the coal industry, and an academic study published after the MTM/VF EIS. The commenter contended that the referenced

documents show that mountain top mining and valley fills do not cause biological impairment and therefore, DEP's assessment of biological impairment through the use of the WVSCI is flawed. Based upon the supplemental studies, the commenter characterized the WVSCI as a "measure of change, not impairment" and opined that "a mere shift" in the biological community should not be equated to impairment because the designated use of the stream remains viable.

The following reference to the MTM/VF EIS was provided:
Further, the EIS studies did not conclude that impacts documented below MTM/VF operations cause or contribute to significant degradation of waters of the U.S. (Programmatic Environmental Impact Statement. Corps, EPA et.al. Pg. II. D-9).
The overwhelming majority of biological impairment listings in the 2008 West Virginia Section 303(d) List do not have associated sources identified and, in no instances, are the specific mining activities evaluated in the MTM/VF EIS identified as source of biological impairment. More importantly, the referenced statement, extracted from thousands of pages of documentation, does not wholly reflect the findings of the MTM/VF EIS.

The MTM/VF EIS clearly recognizes biological impairment in certain waters downstream from evaluated mining activities, as evidenced by the following language that is contained within the same paragraph as the referenced statement:

Biological conditions in the streams with only valley fills represented a gradient of conditions from poor to very good; streams with valley fills and residences were most impacted. Impacts could include several stressors, such as valley fills, residences, and/or roads.

The recognition of biological impairment is also evidenced in the Responses to Comments section of the MTM/VF EIS:

Studies do indicate that aquatic communities downstream of surface coal mining operations and valley fills are impaired in some cases. Certain chemical parameters (sulfates, specific conductance, selenium) are sometimes elevated downstream of mining or valley fills. Stream reaches below mining and valley fills may have changes in substrate particle size distribution from increased fine material due to sedimentation. Some macroinvertebrate communities change in terms of diversity, population size, and pollution tolerance. However, the sample size and monitoring periods conducted for the PEIS were not considered sufficient to establish firm cause-and-effect relationships between individual pollutants and the decline in particular macroinvertebrate populations. Impairment could not be correlated with the number of fills, their size, age, or construction method. See Section II.C. Action 5 in the PEIS recognizes the value of continued evaluation of the effects of mountaintop mining operations on stream chemistry and biology.

In regard to the supplemental studies, the MTM/VF EIS clearly indicates that the opinions and views expressed by the individual authors of referenced studies do not necessarily reflect the position or view of the agencies preparing the EIS. DEP does not interpret the cited studies as demonstrations of universal biological integrity in streams below evaluated activities and disagrees with the commenter's characterization of the WVSCI. A "shift" in the benthic macroinvertebrate community of a stream can constitute biological impairment pursuant to 47CSR2 – 3.2.i, and the WVSCI (recognized as a "best science method" in the MTM/VF EIS) provides a sound scientific basis for assessment.

It was contended that an inaccurate acute-to-chronic ratio was used in EPA's water quality criteria development for chloride, that if rectified would increase the chloride chronic criterion from 230 mg/l to 441 mg/l.
The West Virginia 2008 Section 303(d) List is based upon the currently effective water quality standards. Impairment assessments must compare water quality data and information to the currently effective chronic criterion for chloride (230 mg/l). Future requests for criteria revisions can be considered by DEP, but must be adopted by the Legislature and approved by EPA before they become effective.

The identification of "mining" as the source of impairment for the streams included on the 303(d) list was discouraged. Commenters urged consideration of all potential sources of biological impairment instead of targeting the mining industry and requested that source identification be withheld until stressor identification is performed in TMDL process.
The West Virginia 2008 Section 303(d) list attributes only 17 of 574 biological listings and 7 of 585 numeric water quality listings to mining. DEP recognizes that there are multiple possible sources of biological

impairment and identifies sources as unknown for most initial listings.

However, all of the biologically impaired streams with "mining" identified as the source have undergone stressor identification in a TMDL development process. For each stream, the stressor identification process has identified ionic toxicity as a significant stressor. As documented in each TMDL report, DEP decided to defer biological TMDL development until better information became available regarding the causative pollutants and their associated impairment thresholds, and retained those waters on the Section 303(d) list. In each case, water quality data indicates elevated conductivity and sulfates contributed by mining discharges. Additionally, land use in affected watersheds is overwhelmingly dominated by mining activities. Many of the watersheds have no logging operations, oil and gas wells, or houses.

"Mining" is also identified as source of chloride impairment in seven streams. Each stream is a receiving stream for active mining discharges which exceed appropriately calculated water quality-based effluent limitations. The permittee has sought, but has not been granted, variances from the applicable chlorides water quality criteria. As such, the sources of the chlorides impairment are clear. Those same streams are biologically impaired and it is likely that ionic stress will be identified as a stressor in the TMDL development process. However, since the TMDL-based stressor identification is not yet final, the sources of the biological impairments are specified as "unknown."

Specific requests were received to delist biological impairments for Boardtree Branch (WVKG-5-M) and Stillhouse Branch (WVKG-5-O) and/or to identify the sources of biological impairment as unknown until such time that stressor identification is performed in the TMDL process. The commenter indicated that the biological impairments of the subject streams might be related to habitat deficiencies or influences other than mining operations.

The requested stressor identification process was accomplished during the development of TMDLs for the Gauley River watershed (approved March 2008). The stressor identification process involved a thorough evaluation of water chemistry, habitat, and the benthic macroinvertebrates collected. Under that process, ionic toxicity was identified as the most important biological stressor in each stream. In addition to the ionic toxicity, instream habitat impacts related to manganese precipitation and substrate fusion were also documented.

The streams were sampled between July 2003 and June 2004, as a component of the "Pre-TMDL" monitoring program for the Gauley River watershed. In addition to biological and habitat assessments, monthly water quality samples for multiple pollutant parameters were collected and analyzed. The water quality data for both streams indicates extremely elevated conductivity and sulfates contributed by mining discharges. Over the pre-TMDL sampling period, specific conductance in Boardtree Branch ranged from 2544 to 3341 (umhos/cm) and sulfates ranged from 1575 to 2307 (mg/l). In Stillhouse Branch, specific conductance ranged from 2678 to 3964 (umhos/cm) and sulfates ranged from 1673 to 2915 (mg/l).

Both streams were first identified as biologically impaired on the 2006 West Virginia Section 303(d) list. As described previously, DEP decided to defer biological TMDL development until better information became available regarding the causative pollutants and impairment thresholds associated with ionic stress, and retained those waters on the Section 303(d) list.

Stoneflies were completely absent in the biological assemblages collected in both streams and Stillhouse Branch contained zero mayflies. The severe impacts to those important insect orders are not observed in relation to the alternative stressors suggested by the comment. The landuse assessment conducted in the TMDL process indicates active mining accounts for 99.32% and 99.63% of the Boardtree Branch and Stillhouse Branch watersheds, respectively. The negligible presence of non-mining activities, the predominant contribution of ions from the mining discharges and the mining related habitat impacts clearly support the identification of "mining" as the source of the biological impairments.

The biological impairments of the subject streams have been retained on the Section 303(d) list.

U.S. EPA Approval and Resultant Revisions

The DEP submitted an initial report to the EPA Region III offi ce on October 17, 2008. This submission contained revisions based on EPA ‘s review of the draft 303(d) document noticed for public comment. In addition, EPA Region III provided e-mail comments on subsequent issues that arose during their review of the October 17 submittal. The DEP made necessary revisions and resubmitted the document to EPA Region III on December 5, 2008. The EPA determined the report, as revised, met the applicable requirements of Section 303(d) of the Clean Water Act. EPA approved West Virginia's 2008 Section 303(d) list on January 16, 2009.

A copy of the EPA approval letter and rationale follows, along with DEP's submission letters from October 17 and December 5, 2008. EPA's Approval Rationale documents the applicable statutory and regulatory requirements and explains how West Virginia's 2008 Integrated Water Quality Monitoring and Assessment Report complies with each requirement.

***NOTE: The contents of the letters have not been altered in any way, but have been reformatted to fit this document. Actual signed copies of the letters are available upon request*.**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Mr. Scott Mandirola, Acting Director
Division of Water and Waste Management
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, West Virginia 25304-2345

Dear Mr. Mandirola:

Thank you for the West Virginia Department of Environmental Protection's (WVDEP) final submission on October 21, 2008, of its identification of waters under Section 303(d) of the Clean Water Act (2008 Section 303(d) List).

The U.S. Environmental Protection Agency (EPA), Region III, has reviewed the submission and supporting documentation and, pursuant to Section 303(d) of the Act, 33 U.S.C. §1313(d), hereby approves West Virginia's 2008 Section 303(d) List of water quality limited segments still requiring a Total Maximum Daily Load (TMDL). The enclosed narrative provides an explanation of the basis for EPA's approval.

Thank you again for this submission. If you or your staff have any questions, please feel free to contact Mr. Larry Merrill at 215-814-5452, or Ms. Jennifer Sincock at 215-814-5766 for assistance.

Sincerely,

Signed January 16, 2009
Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Patrick Campbell, WVDEP DWWM
David Montali, WVDEP DWWM

Approval Rationale
West Virginia Department of Environmental Protection
2008 Section 303(d) List

Introduction

U.S. Environmental Protection Agency (EPA) has conducted a complete review of West Virginia's 2008 Section 303(d) List and supporting documentation and information. Based on this review, EPA has determined that West Virginia's list of water quality limited segments ("WQLSs") still requiring Total Maximum Daily Loads (TMDLs) meets the requirements of Section 303(d) of the Clean Water Act (CWA or "the Act") and EPA's implementing regulations. Therefore, by this order, EPA hereby approves West Virginia's 2008 Section 303(d) List. The statutory and regulatory requirements, and EPA's review of West Virginia's compliance with each requirement, are described in detail below.

Statutory and Regulatory Background

Identification of WQLSs for Inclusion on Section 303(d) List

Section 303(d)(1) of the Act directs the states to identify those waters within their jurisdiction for which effluent limitations required by Sections 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The Section 303(d) Listing requirement applies to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of Section 303(d).

EPA regulations provide that states do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the Act; (2) more stringent effluent limitations required by state or local authority; and (3) other pollution control requirements required by state, local, or Federal authority. See 40 CFR §130.7(b)(1).

West Virginia developed an Integrated Report which identifies the assessment status of all of West Virginia's waters combining EPA's Section 303(d) and Section 305(b) requirements. The Integrated Report compartmentalized the waters of West Virginia into five distinct categories. All stream segments or assessment units fall into one of the following categories:

- Category 1 – Fully supporting all designated uses.
- Category 2 – Fully supporting some designated uses, but insufficient or no information exists to assess the other designated uses.
- Category 3 – Insufficient or no information exists to determine if any of the uses are being met.
- Category 4 – Waters that are impaired or threatened but do not need a TMDL.
- Category 4a – waters that already have an approved TMDL, but are still not meeting standards.
- Category 4b – waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses.

- Category 4c – waters that have been determined to be impaired by pollution or other natural factors.
- Category 5 - Waters that have been assessed as impaired and are expected to need a TMDL.

West Virginia's Section 303(d) List of impaired waters is in Category 5 of West Virginia's 2008 Integrated Report. West Virginia also provided the 2008 Section 303(d) List in the same format as the 2006 Section 303(d) List consisting of the Section 303(d) List of impaired waters and six supplemental tables that track previously listed waters. The format of the 2008 Section 303(d) List follows the Watershed Management Framework with five hydrologic groups (A-E). Within each hydrologic group, watersheds are arranged alphabetically and impaired waterbodies are listed alphabetically within their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criteria, the source of the impairment (where known), the impaired size (or, by default, the entire length), the reach description, the projected timing of TMDL development and whether or not the stream was on the 2006 list.

Six supplemental tables were provided to track previously listed waters that are not present on the 2008 Section 303(d) List. "Supplemental Table A - Previously Listed Waters – No TMDL Developed" is a list of previously listed waters which have been reevaluated and determined not to be impaired and, therefore, not in need of a TMDL. Causes for revision of the impairment status include recent water quality data demonstrating improved water quality condition, revision to the water quality criteria associated with the previous listing, or a modification of the listing methodology. Decisions regarding the need for TMDL development were made in accordance with the requirements of 40 CFR §130.7(b)(1) and the state's listing criteria. In the Integrated Report, these waters have been moved from Category 5 to Category 1, 2, 3, or 4, as appropriate.

"Supplemental Table B - Waters with TMDLs Developed" is a list of previously listed impaired waters for which a TMDL has been developed and approved by EPA. Waters included in this supplement have had a TMDL developed, but water quality improvements are not yet complete and/or documented. Since the Section 303(d) List is a list of water quality limited segments still requiring TMDLs (see 40 C.F.R. §130.7(b)), EPA's Integrated Water Quality Monitoring and Assessment Report Guidance recommends classification of such waters in a category separate from the Section 303(d) List. The West Virginia Department of Environmental Protection (WVDEP) developed this supplemental table to track previously listed impaired waters for which TMDLs have been developed. In the Integrated Report, these waters have been listed in Category 4a, which includes waters that already have an approved TMDL but are not meeting standards. Supplemental Table B has a sublist called "Supplemental Table B1 – 2007 TMDLs," which is a list of previously listed waters for which a TMDL was developed and are awaiting EPA approval.

"Supplemental Table C - Water Quality Improvements" is a list of previously listed impaired waters with improved water quality due to TMDL implementation or pre-TMDL stream restoration work that resulted in delisting. These waters are included in Category 1 (meeting all uses), provided that impairments for other uses or pollutants are not present.

"Supplemental Table D - Impaired Waters - No TMDL Development Needed" is a list of impaired waters for which either other control mechanisms are in place to control pollutants or the water is impaired by pollution (i.e., flow alterations caused by mining). These are the same waters contained in Category 4b and 4c, respectively.

"Supplemental Table E - Total Aluminum TMDLs Developed" is a list of previously listed impaired waters for which a total aluminum TMDL has been developed and established by EPA. Due to the criteria change from total aluminum to dissolved aluminum, West Virginia placed total aluminum TMDLs on a separate table from Supplemental Table B. All waters contained on Supplemental Tables B and E are included on Category 4a of the Integrated Report.

"Supplemental Table F – New Listings for 2008" is a list of impaired waters that were not previously included on the 2006 Section 303(d) List.

Consideration of Existing and Readily Available Water Quality-Related Data

In developing Section 303(d) Lists, states are required to assemble and evaluate all existing and readily available water quality-related data and information; including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or as threatened, in the state's most recent Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any Section 319 nonpoint assessment submitted to EPA. See 40 CFR §130.7(b)(5). In addition to these minimum categories, states are required to consider any other data and information that is existing and readily available. EPA's 1991 Guidance for Water Quality-Based Decisions describes categories of water quality-related data and information that may be existing and readily available. See Guidance for Water Quality-Based Decisions: The TMDL Process, EPA Office of Water, Appendix C (1991) (EPA's 1991 Guidance). While states are required to evaluate all existing and readily available water quality-related data and information, states may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring states to assemble and evaluate all existing and readily available water quality-related data and information, EPA regulations at 40 CFR §130.7(b)(6) require states to include as part of their submissions to EPA, documentation to support decisions to rely or not rely on particular data and information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; and (3) any other reasonable information requested by the Region. West Virginia's 2008 Integrated Water Quality and Assessment Report identified the state's assessment methodology and its use of data.

Priority Ranking

EPA regulations also codify and interpret the requirement in Section 303(d)(1)(A) of the Act that states establish a priority ranking for listed waters. The regulations at 40 CFR §130.7(b)(4) require states to prioritize waters on their Section 303(d) Lists for TMDL development, and also to identify those WQLSs targeted for TMDL development in the next two years. In prioritizing and targeting waters, states must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. See Section 303(d)(1)(A). As long as these factors are taken into account, the Act provides that states establish priorities. States may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs, vulnerability of particular waters as aquatic habitats, recreational, economic and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. See 57 Fed. Reg. 33040, 33045 (July 24, 1992) and EPA's 1991 Guidance.

Analysis of West Virginia's Submission

Identification of Waters and Consideration of Existing and Readily Available Water Quality-Related Data and Information

EPA has reviewed West Virginia's submission, and has concluded that West Virginia developed its 2008 Section 303(d) List in compliance with Section 303(d) of the Act and 40 CFR 130.7. EPA's review is based on its analysis of whether West Virginia reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed.

A. Description of the methodology used to develop this list, Section 130.7(b)(6)(i)

West Virginia's 2008 Section 303(d) List was developed using all existing and readily available data. In West Virginia, the WVDEP's Division of Water and Waste Management (DWWM) is responsible for the collection and compilation of this information. In preparation for the Section 303(d) Listing process, WVDEP sought water quality information from various state and Federal agencies, colleges and universities, and private individuals, businesses and organizations. News releases and public notices were published in state newspapers and letters were sent to state and Federal agencies known by WVDEP to be generators of water quality data.

West Virginia's Section 303(d) List is based largely on the data collection and assessment that underlies the §305(b) report of the state's water quality. WVDEP generated the majority of available surface water quality data through the Watershed Assessment Program (WAP) performed within the Watershed Management Framework cycle. Biological data sources included WV Stream Condition Index (WVSCI) scores collected during WVDEP's WAP. Additional data was obtained from state and Federal agencies, local environmental agencies, colleges, and universities, citizen monitoring groups, and private firms. A complete list of data providers is shown on Table 4 of the Integrated Report. West Virginia considered all data and information regarding §130.7(b)(5) categories, which is the minimum required by Federal regulations.

Data evaluation by the agency began in the fall of 2007. In-house personnel possessing varying areas of expertise compared instream data to applicable water quality criteria and determined the impairment status of state waters. The basis for §303(d) Listing decisions relates to the West Virginia water quality standards. In general terms, if water quality standards are exceeded, a waterbody is considered impaired, placed on the §303(d) List, and scheduled for TMDL development. More specifically, a waterbody is considered impaired when it does not attain the designated use assigned to it by applicable water quality standards. Use attainment is determined by comparison of the instream values of various water quality parameters to the numeric or narrative criteria contained in the standards. The West Virginia water quality standards are codified at 46 CSR 1 – Legislative Rule of the Environmental Quality Board - Requirements Governing Water Quality Standards, and at 60 CSR 5 - Legislative Rule of the Department of Environmental Protection – Antidegradation Implementation Procedures. The 46 CSR 1 version used to develop the 2008 Section 303(d) List went into effect July 1, 2008. All water quality standards contained in this version have received the EPA's approval and are currently considered effective for CWA purposes.

In addition, West Virginia provided its rationale for not relying on particular existing and readily available water quality-related data and information as a basis for listing waters. West Virginia DWWM staff evaluated data from internal and external sources to ensure that collection and analytical methods, quality assurance/quality control and method detection levels were consistent with approved procedures. All qualified data from available sources were used in the decision making process. For the stream quality assessment, West Virginia generally used water quality data generated between July 2002 and June 2007. EPA finds West Virginia's screening protocol and criteria described in its 2008 Section 303(d) listing rationale narrative to be a reasonable rationale in determining the usage of outside data, as waters listed as "impaired" should be based on scientifically valid data.

West Virginia released the Draft 2008 Section 303(d) List for public comment on March 24, 2008 through June 6, 2008. Notices of the availability of the Draft 2008 Section 303(d) List were placed in newspapers statewide and promoted via e-mail and the internet. These notices included information on where to obtain the documents and where to send comments. On March 24, 2008, the WVDEP provided EPA with the §303(d) Decision Database which records listing decisions for all waterbodies. After review of the §303(d) Decision Database, EPA provided comments to WVDEP on August 1, 2008, requesting clarification of individual waterbody listings and if any data and/or waters were screened out not used to make listing impairment decisions based on single pollution events. West Virginia received written comments from nine entities including EPA. WVDEP evaluated all comments received and prepared a responsiveness summary detailing WVDEP's actions regarding these comments. EPA concludes that WVDEP properly considered and responded to relevant public comments.

EPA received WVDEP's final 2008 Integrated Water Quality Monitoring and Assessment Report package combining the Section 303(d) List and Section 305(b) report on October 21, 2008. This package included: (1) a listing rationale narrative describing: (a) an overview of the process for development of the 2008 Integrated Report; (b) the assessment methodologies for the following kinds of data: numerical water quality criteria data including fecal coliform and pH, biological impairment, and fish consumption advisories; and (c) an explanation of the data evaluated in the preparation of the list; (2) a summary of comments and responses that could affect the listing of waters; (3) the Section 303(d) List with six supplemental tables tracking previously listed waters; (4) spreadsheets containing information on stream segments in each of the five assessment categories; (5) WVDEP's 303(d) Decision Database which records final listing decisions; and (6) all comment letters received by WVDEP during the public comment period.

West Virginia received comments questioning listing decisions for particular waterbodies. Where commentors advocated for or against particular impairment listings, West Virginia responded to the comments by providing relevant waterbody-specific analyses used in the listing decision; and, where appropriate, making changes to the Section 303(d) List.

EPA recognizes that WVDEP received comments questioning its reliance on biological assessments and the West Virginia Stream Condition Index to identify waters for inclusion on the Section 303(d) List. In identifying water quality limited segments for inclusion on the Section 303(d) List, states must evaluate attainment with water quality standards established under Section 303(c) of the Act, including numeric criteria, narrative criteria, waterbody uses, and antidegradation requirements, based on consideration of all existing and readily available information, including but not limited to assessment information such as chemistry, toxicity, or ecological assessment. Assessment information is particularly important for determining whether a waterbody is achieving its designated use, such as supporting aquatic life, or narrative criteria.

With respect to the various types of assessment information, EPA recommends that the states apply a policy of independent application to determine whether a waterbody is achieving applicable water quality standards. This policy addresses three types of assessment information:

chemistry, toxicity testing results, and ecological assessment. Each of these three methods can provide a valid assessment of non-attainment of a designated use and each independently can provide conclusive evidence of non-attainment without confirmation with a second method. EPA, Final Policy on Biological Assessments and Criteria (June 19, 1991); see also 48 Fed. Reg. 51,400, 51,402 (Nov. 8, 1983) (noting that biological monitoring is one method of testing compliance with narrative criteria); cf. 33 U.S.C. 1313(c)(2)(B) (nothing in Section 303(d) should be construed to limit or delay the use of effluent limitations or other permit conditions based on or involving biological monitoring or assessment methods). Biological assessments can provide compelling evidence of water quality impairment because they directly measure the aquatic community's response to pollutants or stressors, and they can help provide an ecologically based assessment of the compliance status of a waterbody. Memorandum from Geoffrey H. Grubbs, Director, Assessment and Watershed Protection Division, EPA, to Water Management Division Directors, Regional TMDL Coordinators, Regions I-X re Guidance for 1994 Section 303(d) Lists (Nov. 26, 1993).

Following EPA's review of WVDEP's final 2008 Section 303(d) List, EPA identified some additional concerns for which clarification and/or additional listings were provided by WVDEP in subsequent correspondence. West Virginia provided additional information to address EPA's comments and certain discrepancies identified by WVDEP. An electronic copy of West Virginia's revised 2008 Integrated Report combining the Section 303(d) list and Section 305(b) report with associated databases were received by mail on December 17, 2008.

EPA has reviewed West Virginia's description of the data and information it considered, its methodology for identifying waters, and additional information provided in response to comments raised by EPA. EPA concludes that the state properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 CFR §130.7(b)(5).

B. Description of the data and information used to identify waters, including a description of the data and information used by West Virginia as required by Section 130.7(b)(5).

1. Section 130.7(b)(5)(i), Waters identified by West Virginia in its most recent Section 305(b) report as "partially meeting or not meeting designated uses, or as threatened."

West Virginia's 2008 Section 303(d) List was combined with the §305(b) report to form what is now referred to as the Integrated Report. Therefore, the §305(b) report is no longer a stand alone document, and the data that would have gone into development of such a "stand alone" report was used in the production of the Integrated Report. In West Virginia, the biennial water quality assessment is conducted by the WVDEP DWWM. The Integrated Report incorporates the data and evaluations obtained from state and Federal agencies, local environmental agencies, colleges and universities, citizen monitoring groups, and private firms. A complete list of data providers is shown in Table 4 of the Integrated Report. West Virginia relied heavily on ORSANCO's 2006 §305(b) report and used support information when making listing decisions for the Ohio River and the tributaries for which data was available. West Virginia's Integrated Report compartmentalized the waters of West Virginia into five distinct categories which were described above. Waters are defined as being either supporting of all uses, supporting of all uses for which assessment occurred, lacking data for a determination, impaired but not requiring a TMDL, or impaired and requiring a TMDL.

Waters in Category 5, impaired and requiring a TMDL, are those placed on West Virginia's 2008 Section 303(d) List. These waters are found as not attaining their designated uses based on monitoring data. The methodology used to determine non-attainment of designated uses is described in West Virginia's 2008 Integrated Water Quality and Assessment Report. West Virginia also provided the Section 303(d) List with five supplemental tables that track previously listed waters.

2. **Section 130.7(b)(5)(ii), Waters for which dilution calculations or predictive models indicate non-attainment of applicable water quality standards.**

West Virginia relied primarily on water quality monitoring data described above in identifying impaired segments. However, certain waters are included on the 2008 Section 303(d) List based upon modeling results associated with TMDL development. TMDL modeling of the baseline condition for all such waters indicates that pollutant reductions from existing sources are needed to ensure compliance with water quality criteria. In the majority of cases, water quality monitoring and predictive modeling reach consistent conclusions regarding the impairment status of waterbodies. In other cases, monitoring data may not be available, may not have been obtained at critical conditions or locations, or may not reflect the conditions that would exist if point sources were discharging at their permit limits. Where predictive modeling indicated that discharges in accordance with existing permit limits would cause violation of water quality criteria, the designated use of the water quality may be classified as "threatened," thereby subjecting it to Section 303(d) listing and TMDL development pursuant to Section 130.7(b)(5).

3. **Section 130.7(b)(5)(iii), Waters for which water quality problems have been reported by local, state, or Federal agencies; members of the public; or academic institutions**.

West Virginia solicited data from entities outside of the WVDEP. Several waters were placed on West Virginia's 2008 Section 303(d) List as a result of data collected by agencies other than WVDEP as identified in Table 4 of the Integrated Report.

- Federal agencies (i.e., U.S. Geological Survey, National Park Service, and EPA)
- State agencies (i.e., WV Department of Natural Resources, WV Department of Agriculture, and ORSANCO)
- Members of the public (i.e., Friends of Decker Creek, Friends of Cheat)
- Private companies (i.e., Alliance Coal, LLC, Orchard Coal)
- Academic institutions (i.e., WVU Water Research Institute)

West Virginia encouraged comment on its draft lists, and the submission of water quality data, each time the list was public noticed. West Virginia received additional data and information as comments to their Public Notice Draft 2008 Section 303(d) List. In their listing rationale, West Virginia summarized the comments and any changes that were made to the proposed list based on additional data and information.

4. **Section 130.7(b)(5)(iv), Waters identified by West Virginia as impaired or threatened in a nonpoint assessment submitted to EPA under Section 319 of the CWA or in any updates of the assessment.**

West Virginia properly listed waters with nonpoint sources causing or expected to cause impairment, consistent with Section 303(d) and EPA guidance. Section 303(d) Lists are to include all WQLSs still needing TMDLs, regardless of whether the source of impairment is a point and/

or nonpoint source. EPA's long-standing interpretation is that Section 303(d) applies to waters impacted by point and/or nonpoint sources. In Pronsolino v. Marcus, the District Court for the Northern District of California held that Section 303(d) of the CWA authorizes EPA to identify and establish TMDLs for waters impaired by nonpoint sources. Pronsolino et al. V. Marcus et al., 91 F.Supp.2d 1337, 1347 (N.D.Ca. 2000), aff'd, 291 F.3d 1123 (9th Cir. 2002), petition for cert. filed, 71 U.S.L.W. 3531 (Feb. 6, 2003) (No. 02-1186). Also, see EPA's 1991 Guidance and National Clarifying Guidance for 1998 Section 303(d) Lists, Aug. 27, 1997.

5. Other data and information used to identify waters (besides items 1-4 discussed above).

EPA has reviewed West Virginia's description of the data, information, and methodology used by West Virginia in the development of their 2008 Section 303(d) List. This includes supplemental data and information that was submitted in response to EPA's comments. Table 4 of the Integrated Report lists 30 sources of data utilized during the listing process. After this review, EPA has concluded that West Virginia has properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 CFR §130.7(b)(5).

C. A rationale for any decision to not use any existing and readily available data and information for any one of the categories of waters as described in Sections 130.7(b)(5) and 130.7(b)(6)(iii).

West Virginia provided its rationale for not relying on particular existing and readily available water quality related data and information as a basis for listing waters. West Virginia DWWM staff evaluated data from internal and external sources to ensure that collection and analytical methods, quality assurance/quality control and method detection levels were consistent with approved procedures. All qualified data from available sources were used in the decision making process. EPA finds West Virginia's screening protocol and criteria described in its 2008 Integrated Report rationale narrative to be a reasonable rationale in determining the usage of outside data, as waters listed as "impaired" should be based on scientifically valid data.

D. Rationale for delisting of waterbodies from the previous Section 303(d) List.

West Virginia has indicated, through "Supplemental Table A", those waterbodies that were included in previous §303(d) Lists but are now delisted from the 2008 Section 303(d) List. West Virginia has demonstrated to EPA's satisfaction its rationale for these delistings. According to the regulations at 40 CFR §130.7(b), a water may be delisted for the following reasons: more recent or accurate data; more sophisticated water quality modeling; flaws in the original analysis that led to the water being listed in the categories in Section 130.7(b)(5); or changes in conditions (i.e., new control equipment, elimination of discharges).

WVDEP delisted waterbodies due to new water quality analyses demonstrating compliance with water quality standards, revisions to water quality criteria associated with the previous listing, or a modification of the listing methodology. One of the conditions outlined includes more recent or accurate data showing compliance with applicable water quality standards. For the 2008 Section 303(d) List, West Virginia submitted various sets of data demonstrating that certain waters either recovered to the point that the applicable water quality standards have been attained, or were listed in error and are currently not impaired. For other delistings, reassessments revealed that some waters were still impaired, but that the pollutants or impairment lengths had changed. These delisted water pollutant combinations were reassessed using methodologies at least as stringent as the methodology that originally placed the water on the list.

For each segment proposed for removal from the 2008 Section 303(d) List, West Virginia provided EPA with sufficient documentation as justification. Such data included benthic macroinvertebrate data, chemical data, compliance data, and other forms of documentation. EPA reviewed this data and approves the delisting determinations listed in “Supplemental Table A.” Decisions regarding the need for TMDL development were made in accordance with the requirements of 40 CFR §130.7(b)(1) and the state’s listing criteria.

WVDEP has also identified on “Supplemental Table B” those waterbodies where a TMDL has been completed. Consequently, these waterbodies are not included on the Section 303(d) List.

E. Any other reasonable information requested by the Regional Administrator described in Section 130.7(b)(6)(iv).

During the review of West Virginia’s 2008 Section 303(d) List, EPA, Region III, staff requested additional information from West Virginia.

- Justification for differences between EPA recommendations and WVDEP’s final 2008 Section 303(d) List. In comment letters dated August 1, 2008, and various electronic comments sent from November 2008 to December 1, 2008, EPA requested clarification and amendments to West Virginia’s 2008 Section 303(d) List. West Virginia evaluated EPA’s comments and provided explanations. Where appropriate, the list was revised to resolve the discrepancy.

- Justification for delisting segments. West Virginia delisted a number of segments listed on the 2008 list which were provided on “Supplemental Table A – Previously Listed Waters – No TMDL Developed.” Where waters were delisted, the delisting was consistent with the CWA and implementing regulations.

- Clarification of changes to previously listed waters. EPA requested that West Virginia clarify changes in segment length and stream codes to previously listed waters. This information was provided to EPA to justify changes made from previous listing cycles.

EPA concludes that West Virginia has addressed all additional information EPA requested of the state during the review of the 2008 Section 303(d) List.

F. Identification of the pollutants causing or expected to cause a violation of the applicable water quality standards described in Section 130.7(b)(4).

West Virginia identified the pollutants that were causing or expected to cause a violation of the applicable water quality standards for every listed segment where the identity of the pollutant was known. West Virginia included those pollutants for which a numeric water quality criterion was violated, such as fecal coliform. For violations of a narrative criterion, pollutants were rarely identified. Therefore, many waters were listed for violations of the narrative biological standard without identifying a cause since no cause was determined at the time of listing. West Virginia anticipates that the cause of biological impairments will be determined during TMDL development.

G. Priority Ranking and Targeting.

Within the 2008 Section 303(d) List, West Virginia has provided TMDL development dates and a detailed discussion of both the priority ranking and schedule development in its 2008 Section 303(d) List rationale. This discussion includes a description of West Virginia's five-year Watershed Management Framework cycle for its five hydrologic groups (A-E). EPA reviewed West Virginia's priority ranking of listed waters for TMDL development, and concludes that West Virginia properly took into account the severity of pollution and the uses to be made of such waters. Scheduling, however, takes into account additional relevant factors, such as programmatic considerations (i.e., efficient allocation of resources, Watershed Management Framework cycles, and coordination with other programs or states) and technical considerations (i.e., data availability, problem complexity, availability of technical tools). Another factor West Virginia considered in prioritizing its listed waters is the schedule in the Consent Decree resolving Ohio Valley Environmental Coalition, Inc., et al. v. Carol Browner, et al., No. 2:95-0529 (S.D.W.VA.) entered on July 9, 1997, which establishes dates for EPA to ensure TMDL development for all waters and pollutants listed on West Virginia's 1996 Section 303(d) List.

In addition, EPA reviewed West Virginia's identification of WQLSs targeted for TMDL development in the next three years, and concludes that the targeted waters are appropriate for TMDL development in this timeframe. High priority has been placed on these stream segments. For other impairments where the timing of TMDL development is less certain, multiple year entries were indicated that represent the opportunity for TMDL development per the Watershed Management Framework cycle.

Although West Virginia's projected TMDL development dates do not strictly follow EPA's pace guidance of completion within eight to thirteen years since initial listing, West Virginia's TMDL development plans appear consistent with the guidance in that West Virginia plans to develop TMDLs for approximately 100 impaired waters per year and attempts to simultaneously develop TMDLs for all known impairments. The 2008 Section 303(d) List identifies 20 lakes and 913 stream segments. Given West Virginia's TMDL development rate of approximately 100 waters per year, it is likely that West Virginia will comply with EPA's pace guidance.

H. Coordination with the U.S. Fish and Wildlife Service

During West Virginia's public comment period, EPA sent a copy of West Virginia's Draft 2008 Section 303(d) List in electronic correspondence on March 25, 2008, to the U.S. Fish and Wildlife Service (USFWS). EPA requested comments from USFWS regarding the draft list; no comments were received.

December 5, 2008

Larry Merrill
Office of Watersheds
US EPA Region 3 (3WP30)
1650 Arch Street
Philadelphia, PA 19103-2029

Re: West Virginia 2008 Integrated Report

Dear Mr. Merrill:

Following review of comments provided by your staff, WVDEP made various revisions to the 2008 Integrated Report originally submitted to EPA on October 17, 2008, in anticipation of EPA approval Section 303(d) components.

WVDEP made the following final revisions:

- Supplemental Table B was revised to reflect that approved Fe, Al and pH TMDLs are in place for Dow Fork (WVKC-47-G-1).
- Dissolved aluminum and pH TMDLs were deleted from Supplemental Table B for Long Branch (WVKC-47-G).
- On the 303(d) list, the impaired length of Maynard Branch (WVO-2-Q-23) was revised from "mouth to RM 0.4" to "mouth to RM 0.2", and the impaired length of Right Fork Cub Branch (WVO-2-Q-31-A) was revised from "entire length" to "mouth to RM 0.6". The revisions are based upon documentation of the existence of instream impoundments and culverts that we present at the time of biological assessment that limit the representative reach associated with the biological samples collected at or near the mouth of those streams.

Enclosed with this correspondence is a CD containing the revised West Virginia 2008 Integrated Water Quality Monitoring and Assessment Report and supporting documentation. This CD is a complete replacement for the one included with our original submission.

WVDEP remains willing to cooperate in any manner necessary to support EPA's approval of the Section 303(d) List. If you or your staff have any questions or would like to discuss any issue in greater detail, please contact Dave Montali or me at (304) 926-0499.

Sincerely,

Patrick V. Campbell
Assistant Director

Attachments
cc: Scott Mandirola, Acting Director, DEP-DWWM
William Richardson, US EPA
James Laine, DEP-DWWM

October 17, 2008

Larry Merrill
Office of Watersheds
US EPA Region 3 (3WP30)
1650 Arch Street
Philadelphia, PA 19103-2029

Re: West Virginia 2008 Integrated Report

Dear Mr. Merrill:

Pursuant to requirements contained in the federal Clean Water Act, 40CFR130 and in current federal guidelines, I am hereby transmitting West Virginia's 2008 Integrated Water Quality Monitoring and Assessment Report. The report represents a lengthy review of all existing and readily available water quality information on West Virginia's waters, contains information on our assessment methodologies and includes the West Virginia 2008 Section 303(d) List. The Section 303(d) List component is being officially submitted for your approval.

In support of the submission, the following information is provided on the included CD:

- An electronic copy of the document
- Spreadsheets containing information on stream segments in each of the five assessment categories
- West Virginia's 303(d) decision database with supporting electronic data files
- A spreadsheet identifying and rationalizing all of the changes made to the Section 303(d) List and supplements in the time since the documents were released for public comment. This spreadsheet includes revisions initiated by DEP as well as those resulting from EPA comments and public comments.
- A spreadsheet addressing EPA's questions relative to specific stream listings on the Section 303(d) List and Supplements.

Also enclosed are CDs that contain all files needed to port required information into ADB. Two copies are provided to facilitate transfer of the information to RTI.

The Integrated Report contains a Responsiveness Summary addressing public comments received in response to the Draft Section 303(d) List. Hard copies of all public comments are being sent separately.
Consideration was given to the comments provided by EPA Region III. DEP reactions to those comments are provided below.

EPA requested clarification of the statement: "Further, waters are not deemed impaired based upon "not-detected" analytical results from methodologies that have detection limits that are not sensitive enough to confirm criteria compliance."

For certain water quality criteria, the criterion value is lower than the detection level of approved analytical procedures. The statement remains a component of our listing methodology to indicate that the agency would not use the detection limit of the method as an observed, non-attaining, result if the reported value from an appropriate method is "not detected".

EPA asked if any data submitted by external sources was screened out and not used to make listing/impairment decisions.

Certain biological information was submitted during the public comment period that could not be effectively validated and was not directly used in the development of the 303(d) list. That notwithstanding, the submitted information did not absolutely contradict DEP biological data and the agency has committed to work with the provider to improve future data quality and documentation, and to conduct joint biological evaluations. Additional details are provided in the Responsiveness Summary.

EPA requested explanation of any instances where streams were not listed based upon clustered monitoring around a single pollution event or where single pollution events were found not to be representative of current conditions.

The statement "WVDEP does not interpret impacts of single pollution events as representative of current conditions if it is known the problems have abated and does not interpret clustered monitoring of a single event as representative of water quality conditions for longer time periods" is a component of our listing methodology to advise stakeholders of agency philosophy. No specific applications of this provision were made in the 2008 process.

EPA requested correction of the consent decree deadline for TMDLs for mine drainage impaired waters.

The TMDL Development section of the Integrated Report contains the correct consent decree deadline of September 30, 2009.

EPA's questions relative to specific stream listings are addressed in the spreadsheet "WV_2008_IR_Responses_to_EPA_listing_comments_20081007.xls ". Column H of the spreadsheet identifies the changes made to the draft 303(d) list or supplement, and/or provides the requested explanation.

The document represents the best efforts of our staff and I am confident that you will find the report to be both informative and compliant with applicable guidance. The report as submitted to your office will be posted on our website, although we do not intend to print and distribute the document until we obtain your approval of the Section 303(d) portion. As such, I look forward to your timely review and stand ready to explain our actions in any detail necessary for your approval. If you or your staff have any questions or would like to discuss any issue in greater detail please contact Dave Montali or me at (304) 926-0499 (exts.1063, 1046).

Sincerely,

Patrick V. Campbell
Assistant Director

Attachments

cc: Scott Mandirola, Acting Director, DEP-DWWM
Jennifer Sincock, US EPA
James Laine, DEP-DWWM

List Format Description

The format of the 2008 Section 303(d) list is organized around the Watershed Management Framework. The five hydrologic groups (A-E) of the framework provide the skeleton. Within each hydrologic group, watersheds are arranged alphabetically and impaired waters are sorted by stream code in their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criterion, the affected designated use, the general cause of the impairment (where known), the impaired length (or, by default, the entire length), the planned or last possible timing of TMDL development and whether or not the impairment was on the 2006 list. The cause of impairment is often unknown or uncertain at the time of listing and is so indicated on the list. The scheduling of TMDL development is discussed in detail in Section 6. A West Virginia Watershed Management Framework map is provided to assist navigation within the list. A key is also provided to aid in the interpretation of presented information.

List Supplements Overview

Seven supplements are provided that contain additional information. The seven supplements are entitled: "Previously Listed Waters – No TMDL Developed," "Previously Listed Waters – TMDL Developed," "Impaired Waters under TMDL Development," "Water Quality Improvements Being Implemented – Below Listing Criteria," "Impaired Waters – No TMDL Needed," "Total Aluminum TMDLs Developed" and "New Listings for 2008."

Supplemental Table A - Previously Listed Waters – No TMDL Developed

Previously listed waters from the 2006 list that are not on the 2008 list are included in this supplement if a TMDL has not been developed, and these waters have been reevaluated and determined not to be impaired. Causes for revision of the impairment status include recent water quality data demonstrating an improved water quality condition, revision to the water quality criteria associated with the previous listing, documentation that the water was previously listed in error or a modification of the listing methodology.

Supplemental Table B - Previously Listed Waters - TMDL Developed

TMDLs have been developed for many previously listed waters. TMDL development allows the removal of an impaired water from the 303(d) list. In the suggested format of the Integrated Report, such waters are to be classified in Category 4A and clearly distinguished from Category 5 and the 303(d) list. Waters included in Category 4A have TMDLs developed, but water quality improvements are not yet complete and/or documented. The waters identified in Supplement B will match those of Category 4A of the Integrated Report.

Supplemental Table B-1 – Impaired Waters under TMDL Development

TMDLs for certain impaired waters in the New River watershed have been developed by the DEP and are awaiting EPA approval. It is assumed that the EPA will approve these TMDLs prior to their approval of the 2008 Section 303(d) list. Barring unforeseen complications, the waters/impairments shown in Table B-1 will also be included in Category 4A of the Integrated Report.

Supplemental Table C - Water Quality Improvements

The goal of TMDLs and stream restoration projects is to bring the stream back to the point where it meets its designated uses and the associated water quality criteria. Supplement C includes a listing of streams with improved water quality due to TMDL implementation or pre-TMDL stream restoration work resulting in delisting. In the Integrated Report, the waters in Supplement C are to be included in Category 1 (meeting all uses), provided that impairments for other uses/pollutants are not evidenced.

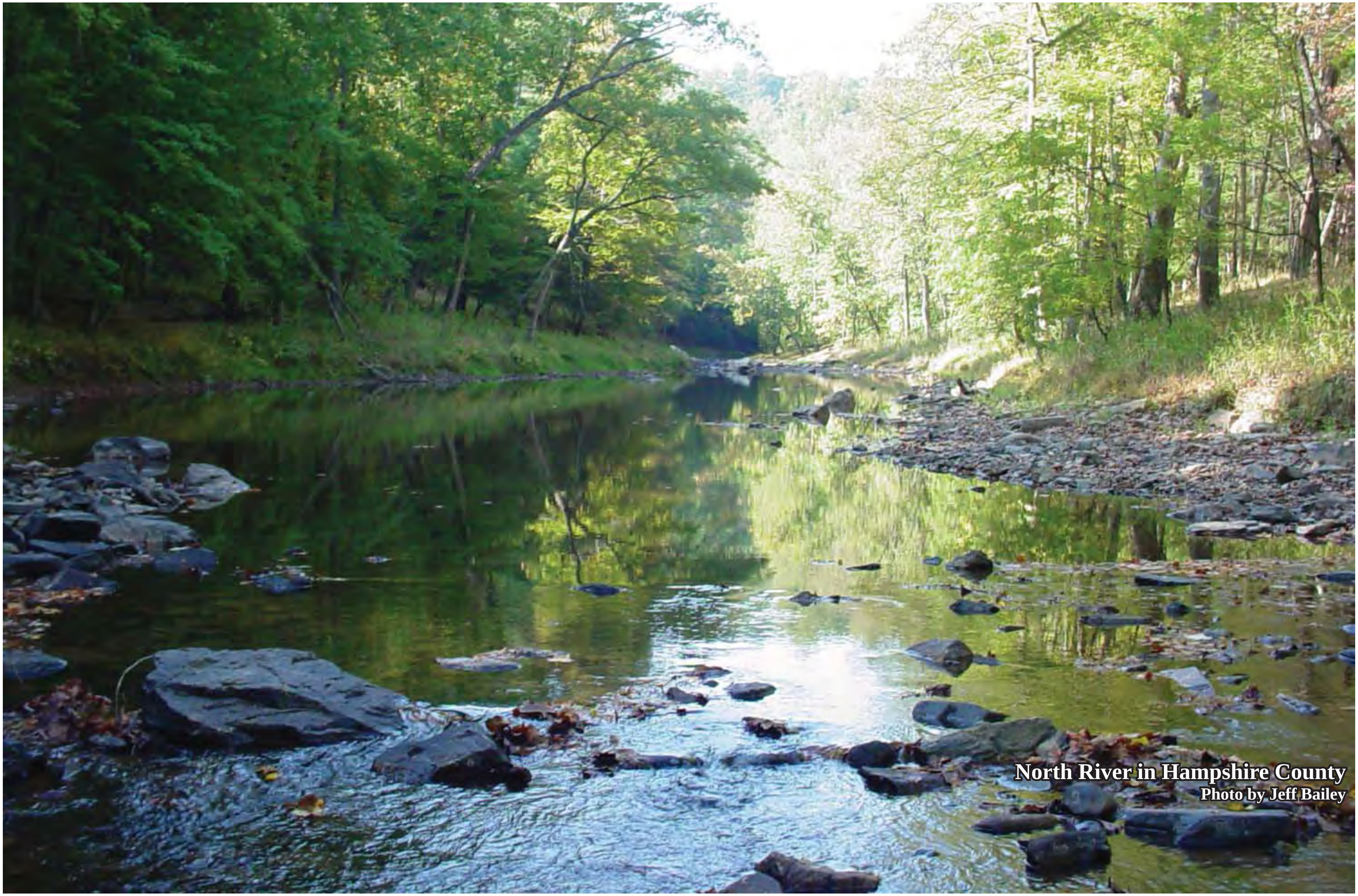
Supplemental Table D - Impaired Waters - No TMDL Development Needed

This table lists impaired waters for which either other control mechanisms are in place to control pollutants or the water is not impaired by a pollutant (i.e., flow alterations caused by mining). These are the same waters contained in the Integrated Report's Category 4b and 4c, respectively.

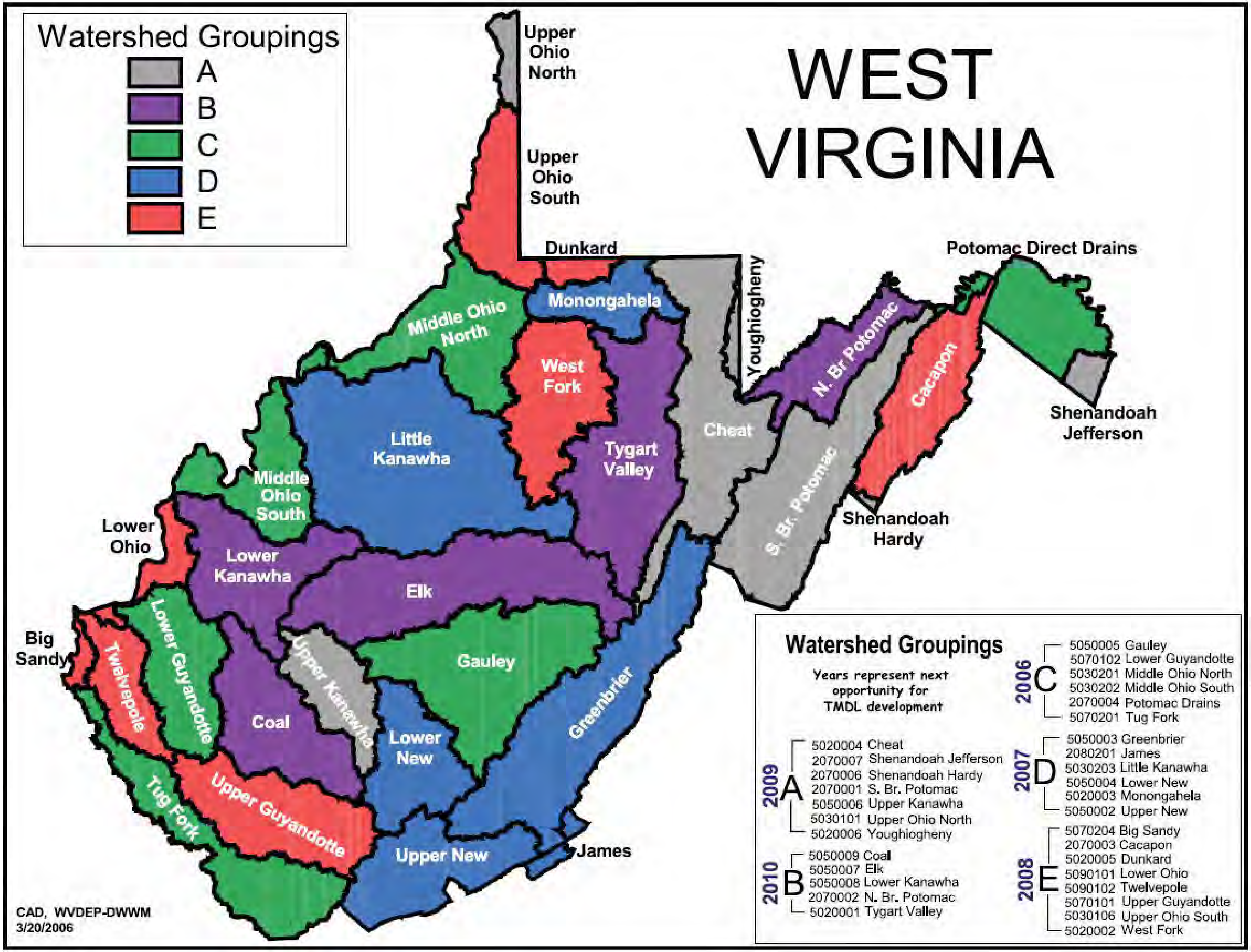
Supplemental Table E - Total Aluminum TMDLs Developed

This table contains a list of previously listed waters for total aluminum TMDL that were developed and established by the EPA. Due to a criteria change from total aluminum to dissolved aluminum, West Virginia placed total aluminum TMDLs onto a separate table from Supplemental Table B.

Supplemental Table F – New Listings for 2008
This table is a list of impaired waters that were not previously included on the 2006 Section 303(d) list.



North River in Hampshire County
Photo by Jeff Bailey


Watershed Groupings
A
B
C
D
E
WEST VIRGINIA
Upper Ohio North
Upper Ohio South
Dunkard
Monongahela
Middle Ohio North
West Fork
Youghiogheny
N. Br Potomac
Cacapon
Potomac Direct Drains
Shenandoah Jefferson
Cheat
Tygart Valley
Little Kanawha
Middle Ohio South
S. Br. Potomac
Shenandoah Hardy
Lower Ohio
Lower Kanawha
Elk
Big Sandy
Twelvepole
Lower Guyandotte
Upper Kanawha
Gauley
Greenbrier
Coal
Lower New
Tug Fork
Upper Guyandotte
Upper New
James
CAD, WVDEP-DWWM
3/20/2006
Watershed Groupings
Years represent next opportunity for TMDL development
2006 C
5050005 Gauley
5070102 Lower Guyandotte
5030201 Middle Ohio North
5030202 Middle Ohio South
2070004 Potomac Drains
5070201 Tug Fork
2009 A
5020004 Cheat
2070007 Shenandoah Jefferson
2070006 Shenandoah Hardy
2070001 S. Br. Potomac
5050006 Upper Kanawha
5030101 Upper Ohio North
5020006 Youghiogheny
2007 D
5050003 Greenbrier
2080201 James
5030203 Little Kanawha
5050004 Lower New
5020003 Monongahela
5050002 Upper New
2010 B
5050009 Coal
5050007 Elk
5050008 Lower Kanawha
2070002 N. Br. Potomac
5020001 Tygart Valley
2008 E
5070204 Big Sandy
2070003 Cacapon
5020005 Dunkard
5090101 Lower Ohio
5090102 Twelvepole
5070101 Upper Guyandotte
5030106 Upper Ohio South
5020002 West Fork

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west virginia department of environmental protection

2010 West Virginia Integrated Water Quality Monitoring and Assessment Report

dep

west virginia department of environmental protection
Division of Water and Waste Management

WEST VIRGINIA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2010

Prepared to fulfill the requirements of Sections 303(d) and 305(b) of the federal Clean Water Act and Chapter 22, Article 11, Section 28 of the West Virginia Water Pollution Control Act for the period of July 2007 through June 2009.

Joe Manchin III
Governor

Randy C. Huffman
Cabinet Secretary
Department of Environmental Protection

Scott G. Mandirola
Director
Division of Water and Waste Management

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Introduction

The federal Clean Water Act contains several sections requiring reporting on the quality of a state's waters. Section 305(b) requires a comprehensive biennial report and Section 303(d) requires, from time to time, a list of waters for which effluent limitations or other controls are not sufficient to meet water quality standards (impaired waters). West Virginia code Chapter 22, Article 11, Section 28 also requires a biennial report of the quality of the state's waters.

This document is intended to fulfill West Virginia's requirements for listing impaired waters under Section 303(d) of the Clean Water Act and the Water Quality Planning and Management Regulations, 40CFR130.7. In addition to the list of impaired waters, it explains the data evaluated in the preparation of the list and methodology used to identify impaired waterbodies. Information is provided that allows the tracking of previously listed waters that are not contained on the 2010 list. The EPA has recommended these requirements be accomplished in a single report that combines the comprehensive Section 305(b) report on water quality and the Section 303(d) list of waters that are not meeting water quality standards. The suggested format of this "Integrated Report" includes provisions for states to place their waters in one of the five categories described in Table 1.

Table 1 - Integrated Report categories

Category 1		fully supporting all designated uses
Category 2		fully supporting some designated uses, but no or insufficient information exists to assess the other designated uses
Category 3		insufficient or no information exists to determine if any of the uses are being met
Category 4		waters that are impaired or threatened but do not need a Total Maximum Daily Load
	Category 4a	waters that already have an approved TMDL but are still not meeting standards
	Category 4b	waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses
	Category 4c	waters that have been determined to be impaired, but not by a pollutant
Category 5		waters that have been assessed as impaired and are expected to need a TMDL

This Integrated Report is a combination of the 2010 Section 303(d) List and the 2010 Section 305(b) report. In general, this report includes data collected and analyzed between July 1, 2004 and June 30, 2009, from the state's 32 major watersheds by the West Virginia Department of Environmental Protection's (DEP's) Watershed Assessment Branch and other federal, state, private and nonprofit organizations. Waters that are included on the 2010 Section 303(d) List are placed in Category 5 of this report.

Water Quality Standards

Water quality standards are the backbone of the 303(d) and 305(b) processes of the federal Clean Water Act. Instream data are compared with water quality standards to determine the use attainment status of streams and lakes. In West Virginia, the water quality standards are codified as 47CSR2 – Legislative Rules of the Department of Environmental Protection – Requirements Governing Water Quality Standards. Impairment assessments conducted for the 2010 cycle are based upon water quality standards that have received the EPA's approval and are currently considered effective for Clean Water Act purposes. In that regard, the EPA has recently approved several changes to the West Virginia Water Quality Standards. Information regarding the approved changes can be found on the DEP's Web page at http://www.dep.wv.gov/WWE/Programs/wqs/Documents/EPA%20 Letters/2009_09_16_07_57_00.pdf

A waterbody is considered impaired if it violates water quality standards and does not meet its designated uses. Use attainment is determined by the comparison of the instream values of various water

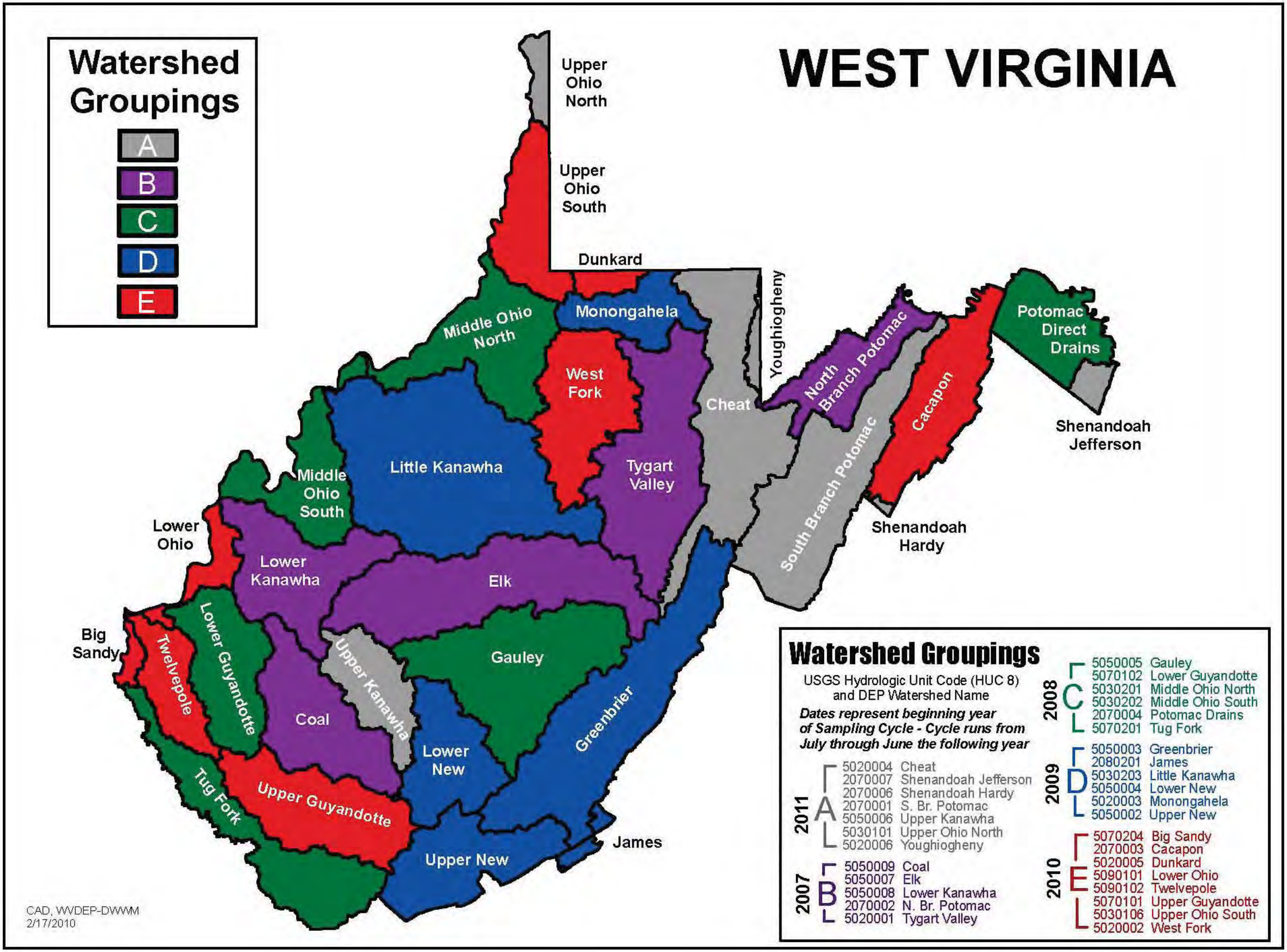
quality parameters to the numeric or narrative criteria specified for the designated use (see the Assessment Methodology section for more information on use attainment determination). Waterbodies that are impaired by a pollutant are placed on the 303(d) List and scheduled for TMDL development.

Some examples of designated uses are water contact recreation, propagation and maintenance of fish and other aquatic life, and public water supply. Designated uses are described in detail in Section 6.2 of 47CSR2 and are summarized in Table 2. Each of the designated uses has associated criteria that describe specific conditions that must be met to ensure that the water can support that use. For example, the "propagation and maintenance of fish and other aquatic life" use requires that the pH remain within the range of 6.0 to 9.0 standard units at all times. This is an example of a numeric criterion. Numeric criteria are provided in Appendix E of the water quality standards.

Numeric criteria consist of a concentration value, exposure duration and an allowable exceedance frequency. The water quality standards prescribe numeric criteria for the "propagation of fish and other aquatic life" use in two forms: acute criteria that are designed to prevent lethality, and chronic criteria that prevent retardation of growth and reproduction. The numeric criteria for acute aquatic life protection are specified as one-hour average concentrations that are not to be exceeded more than once in a three-year period. The criteria for chronic aquatic life protection are specified as four-day average concentrations that are not to be exceeded more than once in a three-year period. The exposure time criterion for human health protection is unspecified, but there are no allowable exceedances.

Table 2 - West Virginia designated uses

Category	Use Subcategory	Use Category	Description
A	Public Water	Human Health	waters, which, after conventional treatment, are used for human consumption
B1	Warm Water Fishery	Aquatic Life	propagation and maintenance of fish and other aquatic life in streams or stream segments that contain populations composed of all warm water aquatic life
B2	Trout Waters	Aquatic Life	propagation and maintenance of fish and other aquatic life in streams or stream segments that sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations
B4	Wetlands	Aquatic Life	propagation and maintenance of fish and other aquatic life in wetlands. Wetlands generally include swamps, marshes, bogs and similar areas
C	Water Contact Recreation	Human Health	swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats
D1	Irrigation	All Other	all stream segments used for irrigation
D2	Livestock Watering	All Other	all stream segments used for livestock watering
D3	Wildlife	All Other	all stream segments and wetlands used by wildlife
E1	Water Transport	All Other	all stream segments modified for water transport and having permanently maintained navigation aides
E2	Cooling Water	All Other	all stream segments having one or more users for industrial cooling
E3	Power Production	All Other	all stream segments extending from a point 500 feet upstream from the intake to a point one-half mile below the wastewater discharge point
E4	Industrial	All Other	all stream segments with one or more industrial users. It does not include water for cooling



WEST VIRGINIA
Watershed Groupings
A
B
C
D
E
Upper Ohio North
Upper Ohio South
Dunkard
Monongahela
Youghiogheny
Middle Ohio North
West Fork
Cheat
North Branch Potomac
Potomac Direct Drains
Cacapon
Shenandoah Jefferson
Little Kanawha
Tygart Valley
South Branch Potomac
Middle Ohio South
Shenandoah Hardy
Lower Ohio
Lower Kanawha
Elk
Big Sandy
Twelvepole
Lower Guyandotte
Upper Kanawha
Gauley
Coal
Greenbrier
Lower New
Tug Fork
Upper Guyandotte
James
Upper New
CAD, WVDEP-DWWM
2/17/2010
Watershed Groupings
USGS Hydrologic Unit Code (HUC 8) and DEP Watershed Name
Dates represent beginning year of Sampling Cycle - Cycle runs from July through June the following year
2011 A
5020004 Cheat
2070007 Shenandoah Jefferson
2070006 Shenandoah Hardy
2070001 S. Br. Potomac
5050006 Upper Kanawha
5030101 Upper Ohio North
5020006 Youghiogheny
2007 B
5050009 Coal
5050007 Elk
5050008 Lower Kanawha
2070002 N. Br. Potomac
5020001 Tygart Valley
2008 C
5050005 Gauley
5070102 Lower Guyandotte
5030201 Middle Ohio North
5030202 Middle Ohio South
2070004 Potomac Drains
5070201 Tug Fork
2009 D
5050003 Greenbrier
2080201 James
5030203 Little Kanawha
5050004 Lower New
5020003 Monongahela
5050002 Upper New
2010 E
5070204 Big Sandy
2070003 Cacapon
5020005 Dunkard
5090101 Lower Ohio
5090102 Twelvepole
5070101 Upper Guyandotte
5030106 Upper Ohio South
5020002 West Fork

Water quality criteria also can be written in a narrative form. For example, the water quality standards contain a provision that states that wastes, present in any waters of the state, shall not adversely alter the integrity of the waters or cause significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. Narrative criteria are contained in Section 3 of 47CSR2. More information regarding the use of narrative criteria is contained in the Use Assessment Procedures section.

Ohio River criteria

For the Ohio River, both the Ohio River Valley Water Sanitation Commission (ORSANCO) and West Virginia water quality criteria were considered, as agreed upon in the ORSANCO compact. Where both ORSANCO and West Virginia standards contain a criterion for a particular parameter, instream values were compared against the more stringent criterion. The DEP supports ORSANCO's efforts to promote consistent decisions by the various jurisdictions with authority to develop 305(b) reports and 303(d) lists for the Ohio River. In support of those efforts, West Virginia has and will continue to work with ORSANCO and the other member states through a workgroup charged with improving consistency of 305(b) reporting among compact states. ORSANCO standards may be reviewed at http://www.orsanco.org/index.php/standards.

Surface Water Monitoring and Assessment

This section describes West Virginia's strategy to monitor and assess the surface waters of the state. The DEP's Division of Water and Waste Management (DWWM) collects most of the state's water quality data. The Watershed Assessment Branch of DWWM is responsible for general water quality monitoring and watershed assessment. The remainder of this section describes the monitoring and assessment activities conducted by the Watershed Assessment Branch.

Streams and Rivers

West Virginia has a comprehensive strategy for monitoring the flowing waters of the state, by far the most prevalent surface waterbody type in the state. The Watershed Assessment Branch utilizes a tiered approach, collecting data from long-term monitoring stations, targeted sites within watersheds on a rotating basin schedule, randomly selected sites, and sites chosen to further define impaired stream segments in support of TMDL development. The following paragraphs present these approaches in further detail.

Probabilistic (random) sampling

Probabilistic sampling began in 1997. This program utilizes sites that are selected randomly by the EPA's Western Ecology Division Laboratory in Corvallis, Ore. The data collected at these sites can be subjected to statistical analysis to provide an overall characterization of a watershed. This analysis can then be used to predict the probability of a condition occurring within a watershed. The initial probabilistic sampling cycle, which concluded in 2001, was conducted in accordance with the five-year Watershed Management Framework cycle. Thirty sites were sampled within each watershed. A second round of probabilistic sampling, initiated in 2002, modified the framework cycle to a statewide approach. The objective for the second round was to collect 30 samples from each watershed over a five-year period (six sites are collected from each watershed annually). Importantly, at the end of the five-year cycle, each of the state's major watersheds will continue to be independently characterizable. The data analyzed for this report covers sampling years 2005 through 2009 and provides an overview of major pollutants impacting state waters.

This departure from the framework cycle minimizes the effects of extreme conditions, such as periodic droughts and flooding and allows for annual updates of statewide stream conditions. Data collection protocols are similar to those applied to watershed assessment sampling including collection of benthic macroinvertebrate for biological community analysis. However, probabilistic sampling includes more rigorous water quality and habitat analysis.

Ambient water quality monitoring network

The ambient water quality monitoring network concept was established

in the early 1960s. The network currently consists of 26 fixed stations that, starting in 2006, are sampled bi-monthly. Sampling stations are located at the mouths of the state's larger rivers and additional sites are situated to isolate the impacts from major industrial complexes and other potential sources of impairment. The data provides information for trend analyses, general water quality assessments and pollutant loading calculations, and allows water resources managers to quickly gauge the health of the state's major waterways.

Targeted sampling

Targeted sampling has been a component of West Virginia's assessment toolbox since the Watershed Assessment Program's inception in late 1995. Streams are sampled according to a five-year rotating basin approach. Sites are selected from the watersheds targeted for each particular year. Each site is subjected to a one-time evaluation of riparian and instream habitat, basic water quality parameters, and benthic macroinvertebrate communities.

Sites are selected to meet a variety of informational needs in the following areas:

- Impaired streams
- Reference (minimally impacted) streams
- Spatial trends (multiple sites on streams exceeding 15 miles in length)
- Areas of concern as identified by the public and stakeholders
- Previously unassessed streams

Pre-TMDL development sampling

The major objective of this effort is to collect sufficient data for Total Maximum Daily Load modelers to develop stream restoration plans. Pre-TMDL sampling follows the framework cycle, i.e., impaired streams from watersheds in hydrologic group A will be sampled in the same year as the targeted sampling.

The 303(d) List is the basis for initial site selection and additional sites are added to comprehensively assess tributary waters and to allow identification of the suspected sources of impairment. Benthic

Figure 1 – West Virginia's ambient monitoring sites

1. Shenandoah River at Harpers Ferry	14. Kanawha River at Winfield
2. Opequon Creek east of Bedington	15. Guyandotte River at Huntington
3. Cacapon River near Great Cacapon	16. Twelvepole Creek south of Ceredo
4. South Branch of the Potomac River	17. Tug Fork at Fort Gay
5. Cheat River at Albright, W.Va.	18. Guyandotte River at Pecks Mill
6. Cheat River below Cheat Lake	19. Coal River at Tornado
7. Monongahela River in Star City	20. Elk River at Coonskin Park
8. Dundard Creek east of Pentress	21. Kanawha River at Chelyan
9. Tygart Valley River at Colfax	22. Gauley River at Beech Glen
10. West Fork River at Enterprise	23. New River above Gauley Bridge
11. Middle Island Creek at Arvilla	24. Greenbrier River at Hinton
12. Hughes River west of Freeport	25. New River at Hinton
13. Little Kanawha River at Elizabeth	26. New River at Virginia state line

macroinvertebrate sampling is conducted in 303(d) listed streams having aquatic life impairments. Assessment of water quality impaired streams is more intensive and consists of monthly sampling for parameters of concern. This method captures data under a variety of weather conditions and flow regimes. Pre-TMDL sampling also includes an effort to locate the specific sources of impairment, with particular attention to identifying non-point source land use stressors as well as any permitted facilities that may not be meeting their permit requirements. For more information, see the TMDL Development Process section.

Lakes and Reservoirs

West Virginia does not make a distinction between lakes and reservoirs. By state definition, a publicly owned lake is any lake, reservoir, or pond that meets the definition of "waters of the state," is owned by a government agency or public utility, and is managed as a recreational resource for the general public. The DEP conducted lake water quality assessments from 1989 through 1996. This program was funded by the federal Clean Lakes Program, which was phased out in 1995. With additional financial support being provided to enhance state's monitoring strategies, DEP added a lake monitoring component in 2006. This program focuses on water quality, collecting field parameters (dissolved oxygen, pH, temperature, and conductivity), nutrient data, clarity, and Chlorophyll A. Multiple sites per lake are sampled and profile data for temperature and dissolved oxygen are obtained.

Many of West Virginia's largest reservoirs are controlled by the U.S. Army Corps of Engineers. Although the Corps' primary mission is to manage structures to provide navigation and flood control, the agency also is committed to water quality management. Data generated by the Corps has been used for assessment purposes.

Additional lake information is available from the West Virginia Division of Natural Resources. The DNR, one of the signatory agencies in the Partnership for Statewide Watershed Management, conducts fish community surveys on many of the state's reservoirs.

Biological Indicators

Benthic macroinvertebrates are collected from riffle substrate in wadeable streams and identified to genus level. This assemblage of aquatic life organisms provides a direct means of assessing the aquatic life use support and can be collected and identified cost effectively. It has the advantage over one-time water quality samples in that the benthic community is affected by and provides indications of past water quality conditions. The DEP currently uses the West Virginia Stream Condition Index, a family-level multimetric index developed specifically for use in West Virginia. This is the primary means of assessing attainment of the aquatic life use.

Wetlands

The State of West Virginia takes great interest in the management of its wetlands both large and small. The current total wetland area within the state is 102,000 acres which comprises less than 1 percent of the State's total acreage {wetland acreage determined by National Wetlands Inventory: WV 1980-86}. As of this report, instituted management efforts are currently geared toward protection of wetlands by regulatory proceedings or acquisition. Permitting authority for activities impacting wetlands (Section 404) lies with the U. S. Army Corps of Engineers. West Virginia insures protection through an active Section 401 certification program.

Since the submission of the last 305(b) report; changes in the status of West Virginia's wetlands monitoring are being pursued. These changes are intended to be the start of a larger statewide monitoring and assessment program. Watershed Assessment personnel have been researching/developing assessment and monitoring strategies in conjunction with the EPA and other states. The Wildlife Resources Section of the Division of Natural Resources, in cooperation with West Virginia University, is also currently evaluating aerial photography from 2003 at a 1:4800 scale to supplement the data from the National Wetlands Inventory. Information from this project will provide improved detail and information, because the original 1986 NWI's imagery was at a 1:48,000 scale. The updated wetland polygons will show any creations, natural changes, human modifications, or loss since the 1986 NWI as well as proper Cowardin classification. A set completion date is not available, but currently six counties have been QA/QC'd by the DNR personnel and the DNR plans to finish most of the state during 2010.

The West Virginia Division of Natural Resources and the DEP plan to begin a wetlands monitoring and assessment program prior to the 2011 National Assessment. Due to the specialized skills of the the DNR, the responsibilities of a majority of field work will fall with the DNR. The DEP will combine efforts and personnel where applicable in the field as well as remain the primary reporting entity for the state. The DNR has recently completed a rapid assessment method for wetlands which can be used statewide. Calibration with intensive assessments and GIS remote assessments on the same wetlands/sites gives us high confidence in data to be generated in future rapid assessments. The DNR plans to start collecting data for database use/storage in the field season of 2010.

A National Wetlands Condition Assessment (EPA) is planned for 2011

Table 3 - Current and future monitoring activities
26 Ambient sites will be monitored monthly (Monongahela River Basin sites) or bi-monthly from July 2009 through June 2011
A third round of probabilistic monitoring that began in the spring of 2007 will continue through 2011. Seventy-eight site are assessed each year. Fish Community assessements are being conducted at approximately one-third of the sites.
Pre-TMDL development monitoring for Group D - 181 sites from 118 streams in the Monongahela River Watershed were sampled from July 2009 through June 2010.
Pre-TMDL development monitoring for Group E - 301 sites from 224 streams in the West Fork River Watershed will be sampled from July 2010 through June 2011.
Group D Targeted Sampling – 53 targeted sites were sampled in 2009. Targeted assessments include water quality, biology, and habitat measures.
Group E Targeted Sampling – Approximately 50 sites will be sampled during the 2010 summer sampling season.
Lakes – Eight lakes within Group E will be sampled four times during the 2010 growing season (May through October) and approximately 10 Group A Lakes will be sampled in 2011.
Water quality meters were deployed at 48 locations on 36 streams. Parameters measured include pH, temperature, conductivity, and dissolved oxygen.
Long Term Monitoring Sites (LTMS or LitMuS). Approximate 50 sites were sampled in 2009. A similar or greater number will be assessed in 2010.

which will encompass the entire United States. The DEP continues to maintain contact with the EPA in preparation for this NWCA; and the DEP and DNR plan to combine efforts to assess the sites in West Virginia. The EPA intends to inform states of site selections by March 2010 and follow with standardized assessment methods by April 2010.

Current wetland information can be found in the booklet <u>West Virginia's Wetlands… Uncommon, Valuable Wildlands</u> (Tiner, 1996). Future valuable information on the number and condition of West Virginia's wetlands will be available from the EPA, DEP, and DNR.

Citizen monitoring

The fourth stream assessment project is the West Virginia Save Our Streams volunteer monitoring program. Initiated in 1989, this program encourages citizens to become involved in the improvement and protection of the state's streams. The focus is largely on nonpoint source pollution abatement. Save Our Streams has two objectives. First, it provides the state with enhanced ability to monitor and protect its surface waters through increased water quality and benthos data collection. Second, it improves water quality through educational outreach to the state's citizens. After citizens are actively involved in stream monitoring and restoration activities, they can initiate improvement projects within their own watersheds. Training workshops are conducted annually to provide quality assurance. A major improvement in data accessibility for the program has been the development of an online Volunteer Assessment Database. As an example of the functions of the new database, volunteer stream reports are now available online at http://www.dep.wv.gov/WWE/getinvolved/SOS/Pages/WAD.aspx. Volunteer monitors can register on the database and enter their own data online, or continue to submit the information to the coordinator for a quality assurance review. The coordinator also is the database administrator, and has tools to verify the quality of the information before it is approved. The database is available for public viewing without registration. In addition, the program prepares an annual "State of Our Streams" report.

DATA MANAGEMENT

Assessed data

All readily available data was used during the evaluation process. In preparation for the development of this report, the agency sought water quality information from various state and federal agencies, college and universities, private individuals, businesses, organizations and others. News releases and public notices were published in state newspapers. Specific requests for data were made to state and federal agencies known by the DEP to be generators of water quality data. The DEP's staff reviewed data from external sources to ensure that collection and analytical methods, quality assurance and quality control and method detection levels were consistent with approved procedures. In addition, DEP has developed guidance for those wishing to submit data. The document contains a list of requirements for submitted data along with helpful internet links and a checklist for data submitters. The guide can be found on the DEP's Web site using the following link: http://www.dep.wv.gov/WWE/watershed/IR/Documents/WV_WQ_Data_Submission_Guidelines_2010.pdf

Assessment decisions are made using the most accurate and recent data available to the agency. For stream water quality assessments, the DEP generally used water quality data generated between July 2004 and June 2009. The use of data more than five years old is intentionally limited. In the absence of new information, previous assessments are carried forward even if the data becomes older than five years. Additionally, if a water quality criteria change is approved which affects an older assessment, the new assessment will only reflect the current criteria.

Waters are not deemed impaired based upon water quality data collected when stream flow conditions are less than 7Q10 flow (the seven consecutive day average low flow that recurs at a 10 year interval) or within regulatory mixing zones. Further, waters are not deemed impaired based upon "not-detected" analytical results from methodologies that have detection limits that are not sensitive enough to confirm criteria compliance.

External data providers

Data submitted from sources outside of the Watershed Assessment Branch were considered in the development of this report. This also includes data from other the DEP programs. Entities that provided information in response to the agency's request for data for the 2010 Section 303(d) list are shown in Table 4. External data received and qualified in the preparation of previous Section 303(d) lists were reconsidered in the 2010 review. Once data was submitted, the DEP performed the following:

- Determined quality and quantity
- Determined stream codes and mile points
- Formatted data for evaluation
- Used qualified data from external sources to make assessment decisions

Table 4 - Data providers for the 2010 303(d) List and Integrated Report

ARGUS Energy	Chesapeake Bay Program Office	West Virginia Department of Agriculture
Don Gasper	Friends of Deckers Creek	West Virginia Department of Environmental Protection
ORSANCO	State of Kentucky	The Conservation Fund Freshwater Institute
U.S. Army Corps of Engineers	USDA Forest Service	U.S. Geological Survey
West Virginia Water Research Institute	Mud River Watershed Decentralized Wastewater Demonstration Project	

USE ASSESSMENT PROCEDURES

The primary focus of this report is to assess water quality information and determine if the designated uses of state waters are impaired. This section describes the various protocols used to determine use impairment.

303(d) Listing Methodology

Numeric water quality criteria

The decision methodology for numeric water quality criteria used in preparation of the draft 2010 Section 303(d) list are consistent with those used in 2008 listing cycle.

Typically, if an ample data set exists and exceedances of chronic aquatic life protection and/or human health protection criteria occur more than 10 percent of the time, the water is considered to be impaired. If the rate of exceedance demonstrated is less than or equal to 10 percent, then the water is considered to be meeting the designated use under evaluation. Ample data sets are defined as sets with 20 or more distinct observations. If fewer than 20 samples per station or representative area exist and three or more values exceed a criterion value, then the water also is considered to be impaired. For this scenario (three observed violations), if additional non-exceeding monitoring results were available that would increase the data set size to 20 observations, a greater than 10 percent exceedance frequency would still exist.

Under West Virginia Water Quality Standards, acute aquatic life protection criteria have associated exposure durations of one hour and may be exceeded once every three years. The normal practice of "grab-sampling" ambient waters is generally consistent with the one-hour exposure duration specified in the standards. Therefore, a direct application of the allowable exceedance frequency provided in the standards is made when assessing impairment relative to acute aquatic life protection criteria. If two or more exceedances of acute criteria are observed in any three-year period, the water is considered to be impaired.

If the data being evaluated is generated as part of a comprehensive network being monitored for a specific purpose, the data may be assigned a higher level of assessment quality, and the "10-percent rule" may be applied with confidence to data sets containing less than 20 observations per station. The primary example of an intensified monitoring program that generates higher assessment quality data is that which is conducted by the DEP to support TMDL development. The pre-TMDL monitoring format includes flow measurement and monthly water quality monitoring for one year at multiple locations throughout a watershed. Information is generated over a range of stream flow conditions and in all seasons. Habitat assessment and biological monitoring is performed in conjunction with water quality monitoring. The information generated under this format is among the most comprehensive available for assessing water quality. Upon conclusion of monitoring, it is then necessary for agency personnel to make a definitive judgment relative to impairment. In most instances, application of the "10-percent rule" to the pre-TMDL monitoring data sets result in the classification of waters as impaired if two or more exceedances of a criterion are demonstrated.

Additionally, the DEP does not interpret the impacts of a single pollution event as representative of current conditions if it is believed that the problem has been addressed. Similarly, the DEP does not intend to interpret the results of clustered monitoring of a single event as being representative of water quality conditions for longer time periods. Datasets are screened for excessive clustering of monitoring, in space or time, to avoid misinterpretation.

Table 5 summarizes the criteria used to make 303(d) impairment decisions relative to numeric water quality criteria period.

Segmentation of streams

The majority of newly listed streams were identified as impaired for their entire length. Segmentation occurred only in limited situations involving streams with impoundments or alternative designated uses, or when knowledge of a specifc pollutant source allowed clear distinction of impaired and unimpaired segments.

Segmentation based upon the limited amount of water quality monitoring data that is usually available may not accurately portray the extent of

Table 5 - Numeric water quality decision criteria for listing of impaired waters		
Water Quality Criteria	**Impairment Thresholds**	**Additional Considerations**
Acute Aquatic Life Protection (Use Category B)	**The water is impaired if two exceedances of acute aquatic life protection numeric criteria occur within any three-year period.**	**If, in the most recent three-year period, no exceedances of criteria are evidenced and at least 12 monitoring results are available, then the water may not considered "impaired."**
Chronic Aquatic Life Protection (Use Category B) Human Health Protection (Use Categories A and C)	**The water is impaired if a greater than 10% frequency of exceedance is demonstrated in an ample dataset (20 or more available observations). The water is impaired if three exceedances of criteria occur with less than 20 available monitoring results. The water is impaired if a greater than 10% frequency of exceedance is demonstrated with less than 20 available observations, if the data being evaluated is of high assessment quality (> two violations)**	**If, for waters with regularly scheduled monitoring, in the most recent two-year period, no exceedances of criteria are evidenced and at least eight observations are available, then the water is not considered impaired.**

impairment and may contradict the ultimate findings of the TMDL that the listing mandates. The DEP believes the TMDL development process, which links extensive water quality monitoring with pollutant sources through computer modeling, provides the best assessment of criterion attainment and the most accurate identification of the watershed sources for which pollutant reductions are necessary. TMDL modeling predicts water quality over a wide range of climatic and stream flow conditions, incorporates the specific exposure duration and exceedance frequency terms of water quality criteria and prescribes pollutants allocations that will result in attainment of criteria in all stream segments.

Evaluation of fecal coliform numeric criteria

Fecal coliform assessments were based on the previously described decision criteria for numeric water quality criteria. Given the complexity of this particular criteria, most assessments are performed by comparing observations to the "maximum daily" criterion value of 400 counts/100ml. Evaluation of the monthly geometric mean fecal coliform criterion (200 counts/100ml) occurs only where five or more individual sample results are available within a calendar month.

Numeric fecal coliform water quality criteria are applicable to the Water Contact Recreation and Public Water Supply designated uses. Section 8.13 of Appendix E of the West Virginia Water Quality Standards states: *Maximum allowable level of fecal coliform content for Primary Contact Recreation shall not exceed 200/100ml as a monthly geometric mean based on not less than five samples per month; nor to exceed 400/100ml in more than 10 percent of all samples taken during the month.*

A practical difficulty exists in accurate assessment of criteria compliance due to the resource commitment that would be necessary to perform monitoring at a sufficient frequency to make determinations using the geometric mean criteria, since the monthly geometric mean criterion is conditioned upon the availability of at least five distinct sample results in a month. The "maximum daily" criterion is not conditioned by a minimum sample set requirement, but practical use of the apparent 10 percent exceedance allowance would involve at least 10 samples per month.

The most frequent and regular fecal coliform water quality monitoring conducted by the Watershed Assessment Section is once per month. That monitoring frequency precludes assessment of the monthly geometric mean criterion and hampers accurate assessment of the maximum

daily criterion. Due to limited resources, more frequent fecal coliform monitoring could only be accomplished by significantly reducing the number of West Virginia streams and/or stations where water quality assessments are performed. The DEP does not consider that to be a reasonable alternative.

The DEP uses the following protocols when making assessments relative to fecal coliform numeric criteria:

- *No assessments are based upon the monthly geometric mean criterion (200 counts/100ml) unless an available data set includes monitoring at five per month or greater frequency. When data sets are available, the listing decision criteria for numeric water quality criteria are applied, considering each monthly geometric mean as an available monitoring result.*
- *The listing decision criteria are applied to the maximum daily criterion (400 counts/100ml) and available individual monitoring results, but without the monthly prejudice. For example, if twice per month monitoring is conducted for a year and two results in two separate months are greater than 400, the stream would be assessed as fully supporting (2/24 – 8.3 percent rate of exceedance) rather than basing assessments on two monts out of 12 in noncompliance (2/12 – 16.7 percent rate of exceedance). If five samples per month monitoring is conducted for one year and four daily results greater than 400 are measured in four different months, the stream would be assessed as fully supporting (4/60 – 6.7 percent rate of exceedance) rather than nonsupporting (4/12 – 33.3 percent rate of exceedance), provided that the monthly geometric means were below the 200 counts/100 ml criteria.*

The decision criteria does not provide for 303(d) listing of waters with severely limited data sets and exceedance (i.e., one sample in a five-year period > 400 counts/100ml). Such waters would be classified as having insufficient data available for use assessment. The DEP will target these "fecal one-hit" waters for additional monitoring by incorporating them into the pre-TMDL monitoring plans at the next opportunity for TMDL development in their watershed. Where the intensified pre-TMDL monitoring (monthly sampling for one year) indicates impairment, TMDL development will be immediately initiated, even though the water may not be included in Category 5 of the current Integrated Report.

Narrative water quality criteria – biological impairment data

The narrative water quality criterion of 47CSR2 – 3.2.i. prohibits the presence of wastes in state waters that cause or contribute to significant adverse impact to the chemical, physical, hydrologic and biological components of aquatic ecosystems. Streams are listed as biologically impaired based on a survey of their benthic macroinvertebrate community. Benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams of West Virginia. The West Virginia Stream Condition Index (WVSCI) is composed of six metrics that were selected to maximize discrimination between streams with known impairments and reference streams. Streams with WVSCI scores of less than 60.6 are considered biologically impaired and included on the 303(d) List. Benthic macroinvertebrates are collected with a 500 mm mesh rectangular dip net. The kick sample is collected from the 1.0 m^2 area of substrate. Identifications are completed for a 200-organism subsample. The WVSCI was developed

West Virginia Stream Condition Index or WVSCI

The WVSCI consists of six benthic community metrics combined into a single multimetric index. The WVSCI was developed by Tetra Tech Inc. (2000) using DEP and EPA data collected from riffle habitats in wadeable streams.

In general terms, all metric values were converted to a standard 0 (worst) to 100 (best) point scale. The six standardized metric scores were then averaged for each benthic sample site to come up with a final index score ranging from 0.0 to 100.0. Using the distribution of scores from all sites that are considered reference sites, an impairment threshold of 68.0 was established. If a stream site received a WVSCI score greater than 68.0, it was considered to be unimpaired.

WVSCI Scoring Criteria
> 68.0 Unimpaired
≥ 60.6 to 68 "Gray Zone"
< 60.6 Impaired

To address the potential variability associated with a number of factors (collector, micro-habitat, subsampling, etc.) a precision estimate was determined by analysis of duplicate biomonitoring data. The precision estimate (7.4 WVSCI points) was subtracted from the impairment threshold to define a "gray zone" of WVSCI scores between 60.6 and 68.0 for which adverse impact to biological integrity is less than certain.

The effective use of limited TMDL development and implementation resources requires the avoidance of impairment misclassifications. Although the true WVSCI impairment threshold is 68.0, DEP identified biological impairment in the 303(d) listing process only in response to WVSCI scores less than 60.6, so as to allow the highest degree of confidence in the validity of the listed biological impairments.

from data using these methods. Streams are listed as being biologically impaired only if the data was comparable (e.g., collected utilizing the same methods used to develop the WVSCI, adequate flow in riffle/run habitat, and within the current index period).

Most streams with low biological scores are listed as having an unknown source/cause of impairment on the 303(d) List and most are listed, by default, for their entire length. It is doubtful that the entire length of every stream is impaired, but without further data, the exact length of impairment is unknown. Each listed stream will be revisited prior to TMDL development. The additional assessments performed in the pre-TMDL monitoring effort will better define the impaired length. The causative stressor(s) of the impairment and the contributing sources of pollution also will be identified during the TMDL development process. If the stressor identification process demonstrates that the biological impairment is not caused by a pollutant, then no TMDL will be developed.

Narrative water quality criteria – fish consumption advisories

The narrative water quality criterion of 47CSR2 – 3.2.e prohibits the presence of materials in concentrations that are harmful, hazardous or toxic to man, animal or aquatic life in state waters. Fish consumption advisories are used to inform the public about potential health risks associated with eating fish from West Virginia's streams. The DEP, the Division of Natural Resources, and the Bureau for Public Health have collaborated on fish contamination issues since the 1980s; however, an executive order by the governor in 2000 mandated a formal collaborative process to issue fish consumption advisories. Fish consumption advisories are developed and issued in accordance with an interagency agreement. In the absence of specific body-burden criteria, the presence of contaminants in fish tissue in amounts equivalent to a two meal per month advisory is considered sufficient evidence of impairment.

Risk-based principles are used to determine whether fish consumption advisories are necessary. These advisories are used as a public education tool to help citizens make informed decisions about eating fish caught in state streams. The risk-based approach estimates the probability of adverse health effects and provides a statement on the health risk facing the angler and high-risk groups including women of childbearing age and children. West Virginia's fish consumption advisories include guidelines on the number of meals to eat and information on proper fish preparation to further minimize risk.

Waterbody-specific fish consumption advisories exist for 16 state streams and six lakes for a variety of fish species and contaminants. Additionally, there is a general statewide advisory that recommends limiting the consumption of certain sport-caught fish from all West Virginia waters in relation to low-level mercury and/or polychlorinated biphenyl (PCB) contamination. The statewide advisory provides species-specific recommendations ranging from one meal per week to one meal per month. The fish advisories Web site is www.wvdhhr.org/fish/current.asp.

The listing of waters based on fish consumption advisories is strongly supported by the EPA. For PCBs, waters are considered impaired if at least one monitoring result for tissue from a commonly consumed species exceeds the two meal per month advisory trigger. In regard to mercury, West Virginia water quality standards contain a numeric body-burden criterion for methylmercury in fish tissue. The criterion for protection of public water supply and water contact recreation designated uses is 0.5 µg/g. In the Ohio River, the applicable ORSANCO body-burden criterion is 0.3 µg/g. Fish tissue mercury impairment decisions are based upon a direct comparison of available observations to the applicable body-burden criteria.

Narrative Water Quality criteria - Greenbrier River algae

In recent years, the DEP has received a number of reports of excessive algal growth along certain sections of the Greenbrier River which has made fishing and swimming in the areas nearly impossible during portions of the summer season. In order to address this loss of recreational use, the DEP began evaluating algal growth on the Greenbrier River in 2007 to determine both the extent of impact and the sources of pollution which were contributing to these conditions.

The initial investigation documented conditions in the mainstem of

the Greenbrier River. Thick algal mats and/or large areas of attached filamentous algae growth occurred over approximately 50 miles of the river, at times stretching from bank to bank. Similar conditions occurred in 2008. During both 2007 and 2008, public water suppliers drawing river water from affected areas received complaints of odor in their drinking water requiring initiation of additional treatment measures.

In 2009, DEP personnel performed intensive water quality sampling along the Greenbrier River as the algae began to bloom. Instream grab samples were analyzed for total and dissolved phosphorus, total nitrogen, alkalinity, hardness, and other parameters. Both the chemical and physical conditions in the Greenbrier River – including hardness, alkalinity, temperature, clarity, and substrate – proved to be ideal for growth of filamentous algae. The water chemistry results also revealed elevated levels of nitrogen and dissolved phosphorus in areas of excessive algae growth, with phosphorus being the limiting nutrient. The written report *Assessment of Filamentous Algae in the Greenbrier River and Other West Virginia Streams* summarizing the investigation is available on the DEP's Web site, www.dep.wv.gov/WWE/watershed/wqmonitoring/documents/Greenbrier/Algae_Summary_WQS_meeting_May_09.pdf.

Currently West Virginia does not have numeric water quality criteria for phosphorus in flowing rivers. However, seasonal non-attainment of designated uses (public water supply and contact recreation) has been documented due to excessive algal growth and the excessive algae growth has been attributed to anthropogenic phosphorous inputs. Non-attainment of uses is based on multiple provisions of Title 47-2-3.2 of the West Virginia Legislative Rules ("Conditions Not Allowable in State Waters"). Section 3.2.a prohibits distinctly visible floating and suspended solids (filamentous algae mats) which pervade large reaches of the Greenbrier River. Section 3.2.h prohibits conditions that require treatment beyond conventional treatment to produce finished drinking water and Section 3.2.i prohibits conditions caused by wastes that adversely alter the integrity of a stream, including impacts to the physical, chemical and biological components of an aquatic ecosystem. In the case of the Greenbrier River, the DEP has determined the existence of the prohibited conditions and causation by a pollutant. The DEP is assessing the Greenbrier River as impaired from its mouth upstream to mile point 102.7.

ASSESSMENT RESULTS

This section contains the results from all the data that has been assessed for West Virginia waterbodies. Table 6 shows a summary of the classification of West Virginia waters under the five "Integrated Report" categories (see page 4). The results reveal that 23 percent of West Virginia's stream miles are in either Category 1 or 2 (fully supporting all or some assessed uses). Category 3, streams with insufficient data, makes up 39% of stream miles, the largest percentage of the five categories. However, that number is somewhat deceiving. The streams with limited data are typically small unnamed tributaries, which usually contribute to the larger waterbodies which have been assessed. All major rivers in the state; the Kanawha, Monongahela and Little Kanawha rivers, have data and have been assessed and placed into one of the other four categories. Approximately one-third of West Virginia's streams are impaired and fall into either Category 4 or 5.

Category 1, Category 2, and Category 3 waters are quite large, therefore, they are not published in this document. The three categories can be viewed on DEP's Web site, www.dep.wv.gov. Waters listed in category 4 are included in the supplements toward the back of this document in Supplemental B, B1, and D sections. Category 5 waters are included in the document and is the 303(d) List.

Category 5 includes 1091 impaired stream segments, covering approximately 6,685 stream miles that are impaired and need TMDLs developed. This number has increased from 6,157 miles of impaired streams identified on the 2008 list. The increase is due, in part, to the TMDL development timeline. TMDLs always are in various stages of development, and with the additional sampling data generated, streams and stream segments may move from Catergories 1, 2 or 3 to Category 5.

Table 6 - 2010 Category Summary Report for West Virginia					
LAKES					
Type	**CATEGORY**	**# of lakes**	**% lakes**	**acres**	**% acres**
Lake	**1**	**27**	**20**	**522**	**2**
Lake	**2**	**47**	**36**	**5990**	**26**
Lake	**3**	**43**	**32**	**10029**	**43**
Lake	**4a**	**9**	**7**	**189**	**1**
Lake	**5**	**6**	**4**	**6498**	**28**
	TOTAL	**132**	**100**	**23228**	**100**
STREAMS					
Type	**CATEGORY**	**# of stream segments**	**% stream segments**	**miles of streams**	**% miles**
Stream	**1**	**1269**	**11**	**4378**	**14**
Stream	**2**	**824**	**7**	**2834**	**9**
Stream	**3**	**6776**	**61**	**11711**	**39**
Stream	**4a**	**1180**	**11**	**4883**	**16**
Stream	**4b**	**2**	**0**	**2**	**0**
Stream	**4c**	**36**	**0**	**35**	**0**
Stream	**5**	**1091**	**10**	**6685**	**22**
	TOTAL	**11178**	**100**	**30528**	**100**

Additionally, TMDLs that have not yet been approved by the EPA remain listed in Category 5. Once these TMDLs are approved, those streams and stream segments will move to Category 4a.

Table 7 contains a breakdown of use support specific to the use categories for state waters as set forth in the Water Quality Standards (47CSR2). The most common impairments of West Virginia waters are:

- Biological impairment, as determined through application of the West Virginia Stream Condition Index
- Bacterial contamination evidenced by exceedance of numeric water quality criteria for fecal coliform
- Exceedance of numeric water quality criteria for pollutants associated with mine drainage (low pH, and high concentration of iron, aluminum, and/or manganese)
- PCB fish tissue contamination, and
- Low pH associated with acid rain

The list and the summary results of Tables 8 and 9 provide an overview of the impairment status of West Virginia waters. An alternative mechanism for assessing general status and the relative impacts of various causes and sources is provided by DEP's Probabilistic Monitoring Program. The program and assessment results are described in the Probabilistic Data Summary section.

Table 7 - West Virginia use support summary

LAKES																		
Designated Use	Number of Lakes	Size (acres)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Acres	%	#	%	Acres	%	#	%	Acres	%	#	%	Acres	%
A - Public Water	132	23228	33	25	852	4	55	42	20772	89	35	26	1415	6	9	7	189	1
B1 - Warm Water Fishery	113	17891	25	22	550	3	44	39	15737	88	35	31	1415	8	9	8	189	1
B2 - Troutwater	19	5337	12	63	999	19	7	37	4338	81	0	29	0	0	0	0	0	0
C - Contact Recreation	132	23228	62	47	3395	15	25	19	11863	51	38	29	1468	6	7	5	6502	28
D - Agriculture and Wildlife	132	23228	70	53	6243	27	23	17	15513	67	38	29	1468	6	1	1	4	0
E -Industrial	132	23228	70	53	6243	27	23	17	15513	67	38	29	1468	6	1	1	4	0
Total	132	23228																

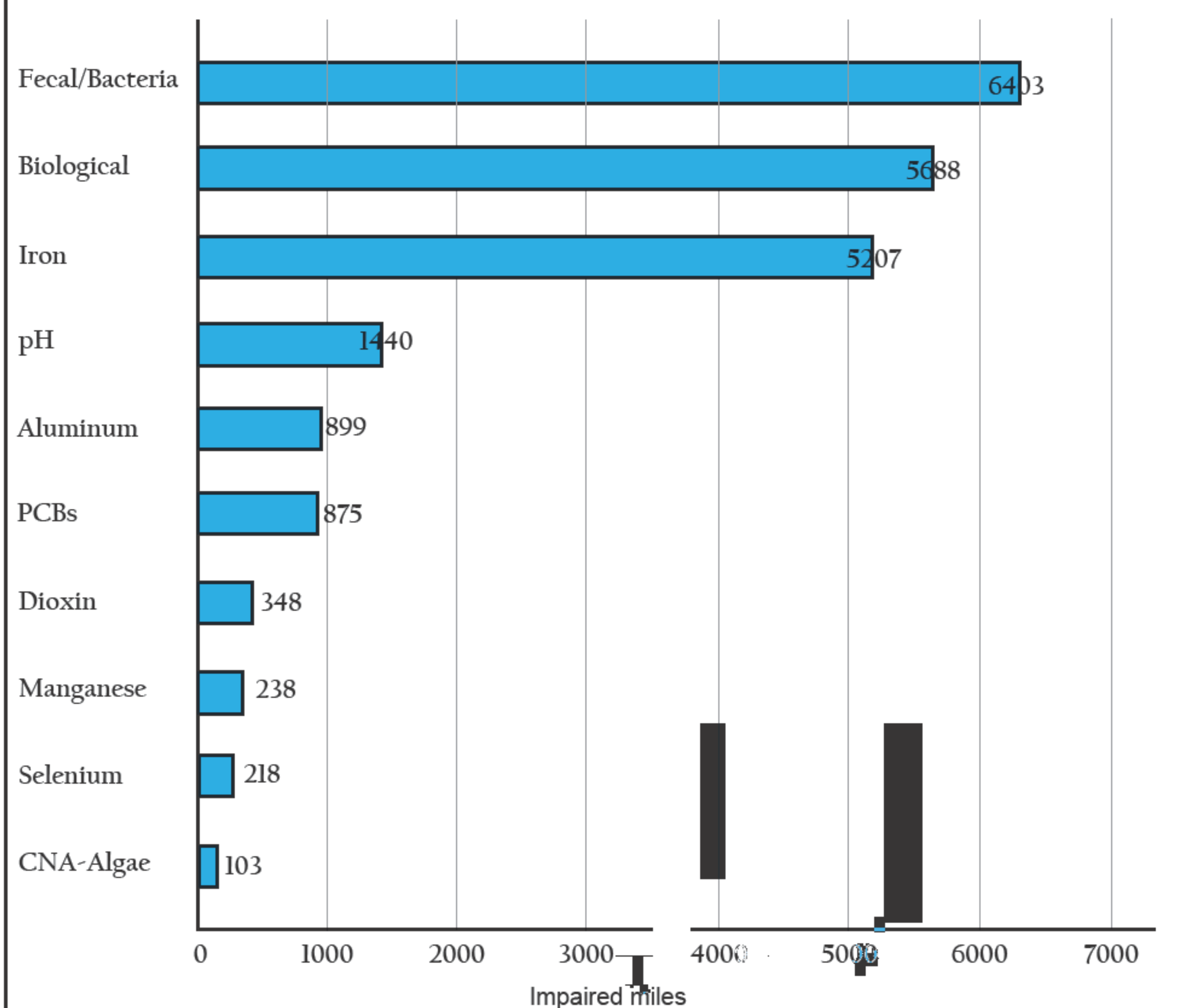
STREAMS																		
Designated Use	Number of Stream Segments	Size (miles)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Miles	%	#	%	Miles	%	#	%	Miles	%	#	%	Miles	%
A - Public Water	11175	30525	2319	21	9120	30	437	4	1060	3	6603	59	11269	37	1816	16	9076	30
B1 - Warm Water Fishery	10146	25473	1166	12	3935	15	992	10	3207	13	6323	62	10637	42	1665	16	7694	30
B2 - Troutwater	1032	5051	347	34	1979	39	228	22	1292	26	278	27	628	12	179	17	1152	23
C - Contact Recreation	11178	30528	2368	21	8616	28	720	7	2641	9	6622	59	11303	37	1468	13	7968	26
D - Agriculture and Wildlife	11177	30527	3694	33	15896	52	343	3	1471	5	6622	59	11303	37	518	5	1858	6
E -Industrial	11178	30528	3694	33	15896	52	343	3	1471	5	6622	59	11303	37	519	5	1858	6
Total	11178	30528																

Table 8 - Summary of the causes for impaired streams

TYPE	CAUSE	SIZE (acres)
Lake	Sedimentation/ Siltation	193
Lake	Trophic State Index	100
Lake	Iron	54
Lake	DO	8
Lake	PCBs	6498
TYPE	**CAUSE**	**SIZE (miles)**
Stream	Temperature, water	2.3
Stream	Ammonia	5.4
Stream	Chloride	21.6
Stream	Lead	23.3
Stream	DO	25.2
Stream	Nitrite	30.7
Stream	Low Flow Alterations	44.3
Stream	Manganese	238
Stream	Zinc	17.7
Stream	Selenium	218
Stream	Dioxin	348
Stream	Aluminum	899
Stream	PCBs	875
Stream	pH	1440
Stream	Iron	5207
Stream	Fecal/Bacteria	6403
Stream	Bio-Impairment	5688
Stream	CNA - Algae	103

Table 9 - Number of miles for the leading causes of West Virginia impaired streams

(shows causes with >100 miles impaired)

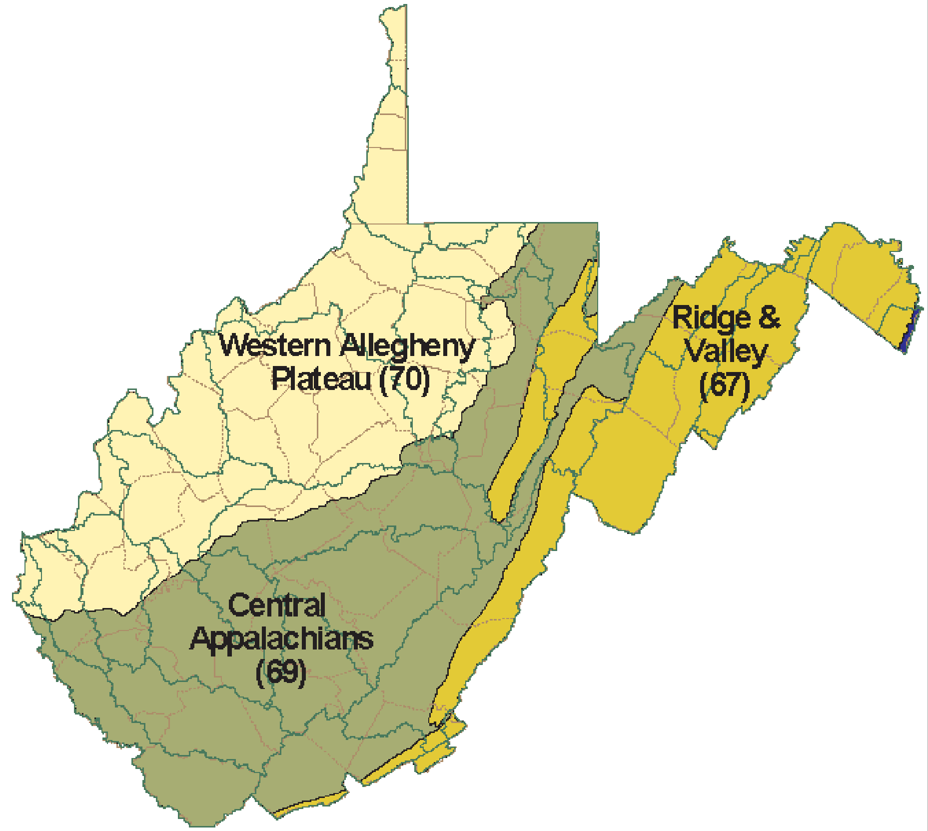


Probabilistic Data Summary

The probabilistic design used for this report was stratified to ensure adequate coverage across all watersheds and allows the state to characterize overall water quality conditions at the watershed (USGS 8-digit HUC) level in addition to providing statewide estimates of condition. The goal of any probabilistic program is to provide statistically unbiased estimates of stream condition throughout a particular region (i.e., watershed, ecoregion or state) without assessing every single stream mile in that region. This approach can be used to describe various aspects of stream conditions including, the proportion of stream miles with biological impairment, the proportion of stream miles with specific water quality criteria violations, and the characterization of the relative importance of stressors such as sedimentation or acid precipitation.

In 2006, West Virginia completed its second 5-year cycle using a sample design that provided data from 750 sites from wadeable streams statewide. The target population for this effort was small to medium sized (1st-4th order) wadeable streams. Ninety-eight percent of West Virginia's stream miles are of this size class and approximately 70% of these are wadeable. This level of effort allows for estimations of conditions across the state with a high degree of confidence. The sites are spread across 25 watersheds and watershed groupings (some small watersheds are combined with adjacent ones) and allow estimates of conditions at this scale, but with lesser confidence. Six sites were sampled in each of the 25 watersheds each year, resulting in 30 samples per watershed at the end of the five-year design. While this design does allow for watershed level characterizations following the completion of the cycle, describing these estimates for the more broad classification of Level 3 Ecoregions reduces the uncertainties around the different estimates of condition. The DEP is currently in its third cycle of monitoring ambient conditions using the Probabilistic Method. This report summarizes the data from the last two years from the previous cycle (2002 – 2006) and the first three years from the third cycle (2007 – 2009) and are described in terms of ecoregions.

Figure 2– West Virginia's ecoregions map



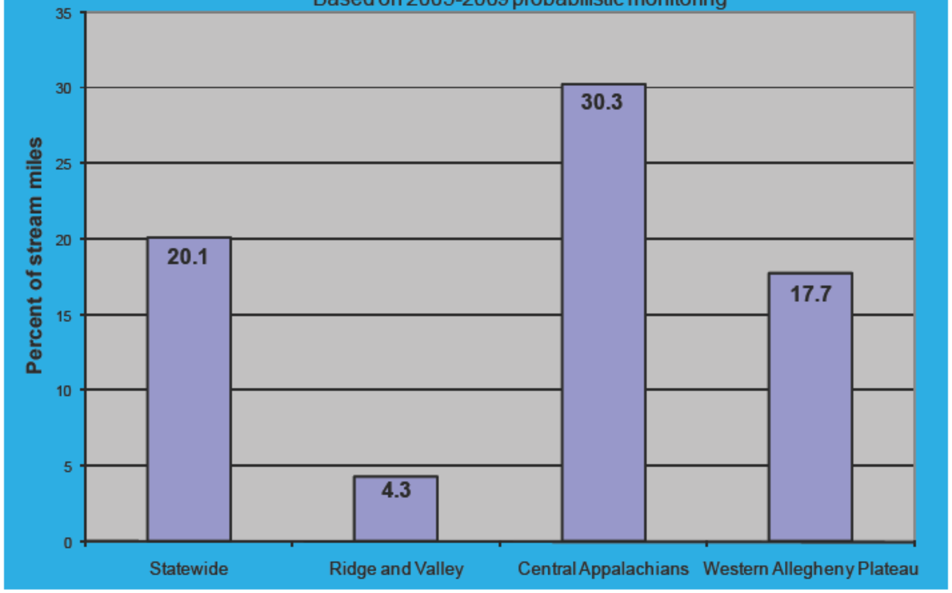
Mine drainage

Mine drainage streams may be impaired by low pH and/or elevated concentrations of metals, including iron, aluminum, and manganese. Other dissolved ions such as sulfate may also be present in concentrations above ambient levels. A sulfate concentration greater than 50 mg/L was used to identify probabilistic sites influenced by mine drainage. Following this guideline, approximately 20.1% of the stream miles statewide are influenced by mine drainage (Table 10). Observed on an ecoregional basis, mine drainage influences a greater proportion of stream miles in the coal rich Central Appalachians (Ecoregion 69) than in the Ridge and Valley (Ecoregion 67) or Western Allegheny Plateau (Ecoregion 70). About 30.3% of the stream miles in the Central Appalachians are influenced by mine drainage. Contrastingly, about

Table 10

Percent of stream miles influenced by mine drainage - as indicated by elevated sulfate (> 50 mg/L)

Based on 2005-2009 probabilistic monitoring



4.3% and 17.7% of stream miles are influenced by mine drainage in the Ridge and Valley and Western Allegheny Plateau, respectively.

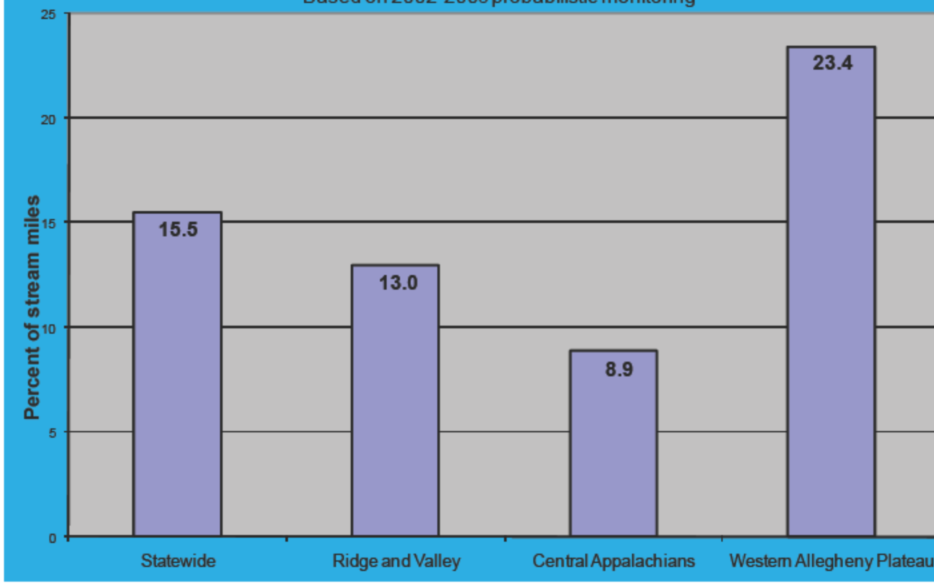
Bacterial contamination

Many West Virginia waters contain elevated levels of fecal coliform bacteria. Contributors to the problem include leaking or overflowing sewage collection systems, illegal homeowner sewage discharges by straight pipes or failing septic systems, and runoff from urban or residential areas and agricultural lands. Based on probabilistic data, about 15.5% of stream miles in the state have fecal coliform bacteria levels that exceed the criterion of 400 colonies/100mL (Table 11). In general, watersheds in the more developed regions of the state had a greater proportion of stream miles exceeding the criterion. The proportion of stream miles violating the criterion was highest in the Western Allegheny Plateau Ecoregion (23.4% of stream miles) and somewhat lower in the Central Appalachians (8.9% of stream miles) and the Ridge and Valley Ecoregions (13.0% of stream miles). It should be noted that the probabilistic monitoring is performed at baseflow conditions. Because samples are not collected during storm runoff

Table 11

Percent of stream miles with fecal coliform bacteria > 400 colonies/100 ml

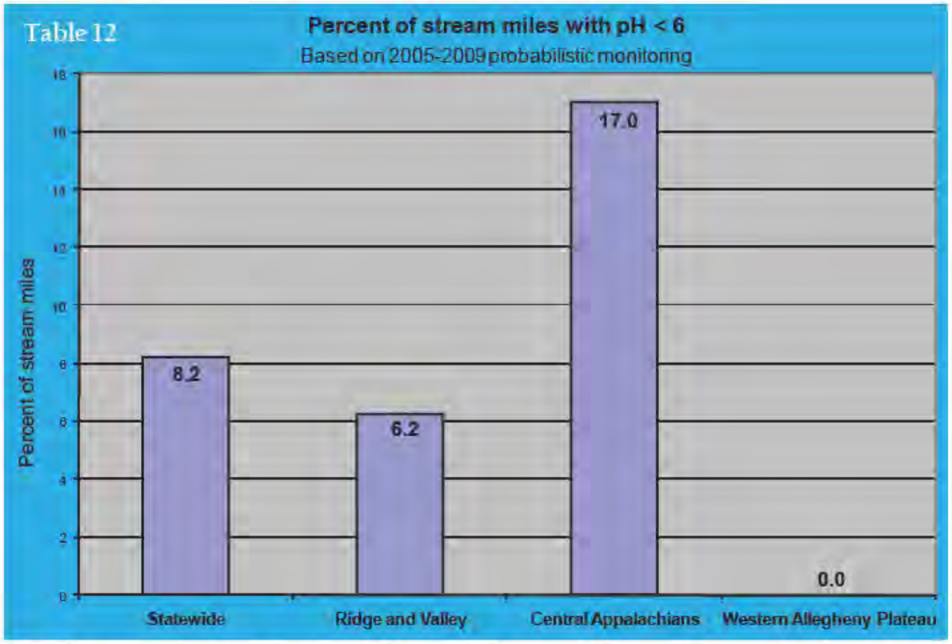
Based on 2002-2006 probabilistic monitoring



events, bacteria levels that would likely increase under these higher flow conditions are not accounted for in this assessment.

Acidity

The aquatic life communities in the headwater sections of many West Virginia waters continue to be impacted by low pH acidic water quality. The impairment is most prevalent in watersheds with soils of low buffering capacity and most often caused by acid precipitation and less often (but more severely) by acid mine drainage. An evaluation of probabilistic data indicates that approximately 8.2% of the stream miles in the state have pH values below 6.0 (Table 12). Most of the stream miles identified as impacted by acidic waters are in the Central Appalachians Ecoregion, representing 17.0% of the stream miles within this area. Specifically, the Forested Hills and Mountains section of this ecoregion are largely susceptible to acid deposition impacts due to infertile soils and resistant sandstones of the Pottsville group. The Ridge and Valley Ecoregion is less susceptible to the impacts of acid deposition with geologic materials such as limestone and shale providing more buffering capacity to neutralize acid precipitation. Nonetheless, probabilistic data indicates that approximately 6.2% of the stream miles



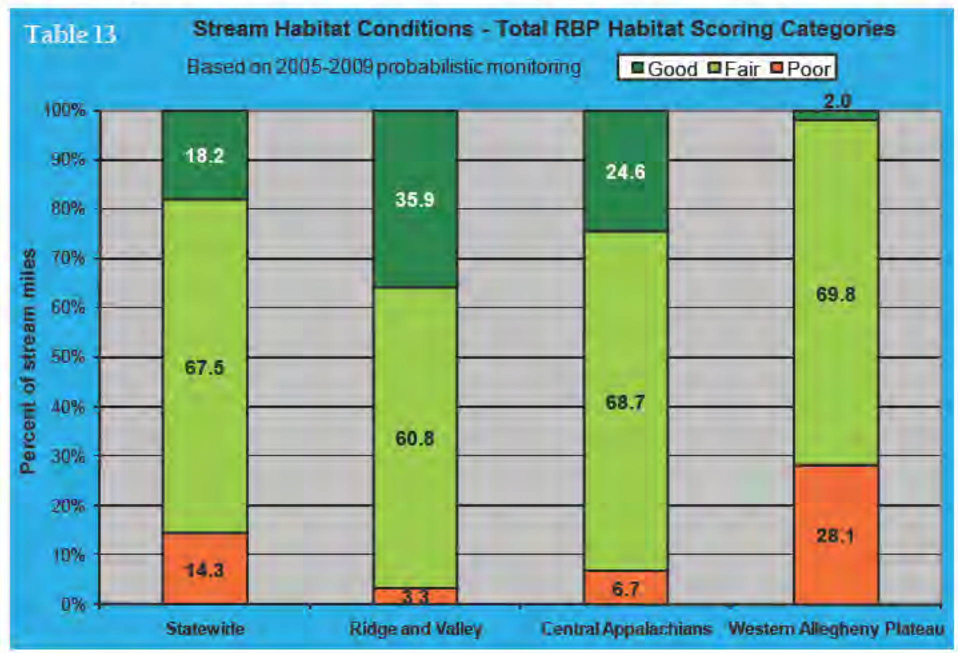
in this ecoregion are impacted by acidic conditions. There are almost no stream miles with impacts attributed to acidic conditions in the Western Allegheny Plateau ecoregion. Again, this ecoregion has well buffered soils that limit the impacts of acid precipitation and acid mine drainage.

Habitat quality

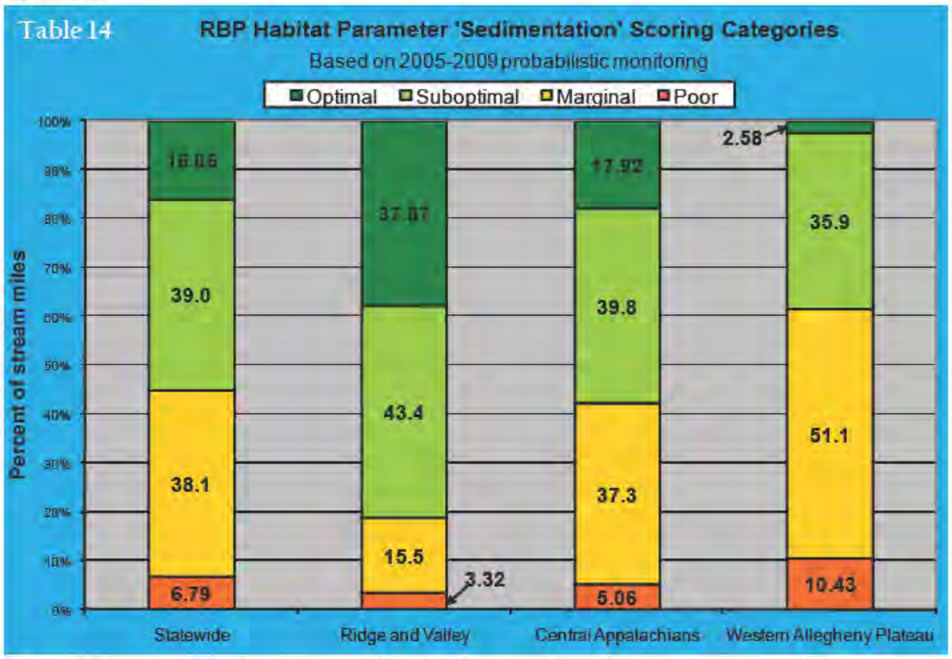
It is nearly impossible to accurately interpret the biological health of streams without measuring various aspects of habitat quality. During the course of probabilistic sampling, DEP personnel collected data on many features of both riparian and instream habitat known to be important to the biological communities of streams. Habitat parameters from the EPA's Rapid Bioassessment Protocol (RBP) were measured. These include measures of the amount of sediment and embeddedness in the stream channel as well as measures of the vegetation along the bank and riparian zone in the stream corridor. Specifically, ten characteristics are scored (0-20) based on their quality and then combined to assess the overall physical habitat condition of the site. The overall scores (Total RBP Habitat) were categorized as good, fair, or poor (Table 13). Based on probabilistic data, about 18.2% of stream miles have good habitat quality (total RBP score of 160 or greater), 67.5% of stream miles have fair habitat quality (110–159), and 14.3% of stream miles have poor habitat quality (< 110). While these categorical thresholds are somewhat arbitrary, they do provide a good comparison of one area to another.

The Ridge and Valley and Central Appalachians Ecoregions are similar with respect to overall habitat quality. Over 24% of stream miles in each of these ecoregions are of good quality and less than 7% are poor with respect to overall habitat quality. In comparison, habitat quality scores are lower in the Western Allegheny Plateau. The presence of more widespread development and factors such as higher rates of soil erosion in this ecoregion are potential causes for only 2% of its stream miles being rated as good in overall habitat quality. Additionally, the proportion of stream miles with poor habitat quality (28.1%) is substantially higher in this ecoregion. It is important to consider that the greatest proportion (over 97%) of stream miles in the state are in the fair or lower habitat categories. This indicates that most of the state's stream miles have at least some degree of habitat perturbation degradation.

Although the DEP may gain insight into overall habitat conditions by combining the individual measures, it is useful to examine specific



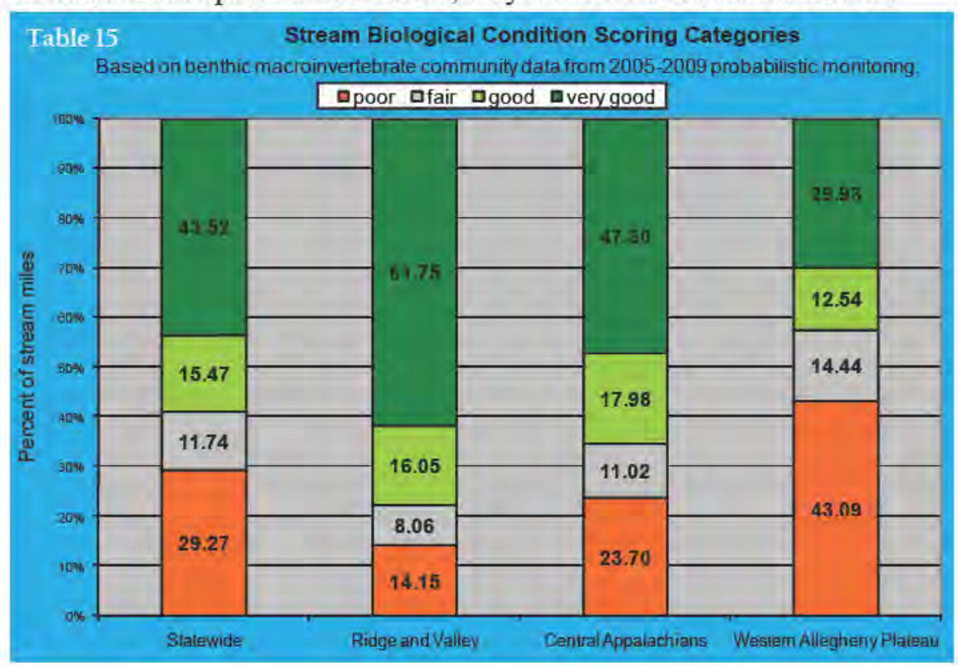
habitat characteristics. Sedimentation is one of the most significant problems facing West Virginia streams. Significant sources of increased sedimentation include agricultural activities, mining, logging, oil and gas, roads, urban and suburban development, and removal of stream bank and riparian vegetation. The effects of sediment deposition on stream biota are well known and include interference with respiration and the smothering of physical habitat and organism eggs. The categories used to rate the individual habitat characteristics are labeled as optimal, suboptimal, marginal, and poor (which match the field assessment forms). Sedimentation results for the state as a whole indicate that 6.79% of stream miles are in poor condition, 38.1% stream miles are marginal, 39% of stream miles are suboptimal, and 16.06% of stream miles are in optimal condition (Table 14). As with the overall habitat scores, the widespread impacts of sedimentation in West Virginia are apparent in that over 83% of the wadeable streams miles in the state score less than optimal.



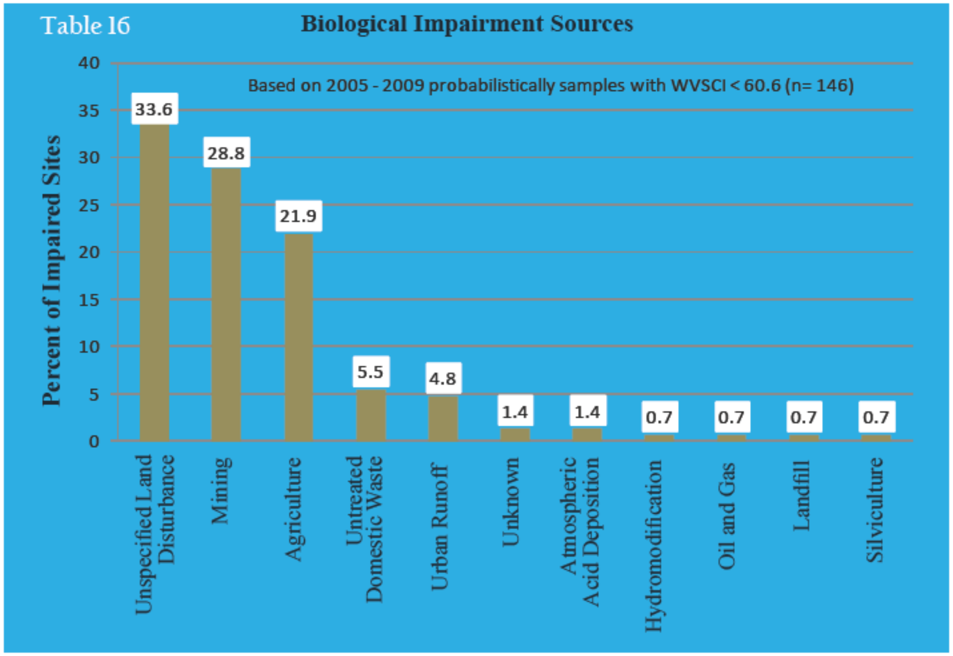
The Ridge and Valley Ecoregion is better than both the Central Appalachian or the Western Allegheny Plateau Ecoregions regarding sedimentation. In the Ridge and Valley ecoregion, 37.87% of stream miles are in optimal condition and 3.32% are in poor condition. Results for the Central Appalachians are poorer than the Ridge and Valley ecoregion but better than the Western Allegheny Plateau Ecoregion, with 17.92% of stream miles in optimal condition and 5.06% of stream miles in poor condition. The Western Allegheny Plateau continued to show substantial problems in habitat quality. In contrast to the Ridge and Valley, less than 3% of stream miles in this ecoregion are in optimal condition and just under 61.53% of stream miles are in poor or marginal condition in terms of sedimentation. The presence of more widespread development and higher rates of soil erosion in this ecoregion are potential causes of the observed increase in sedimentation and resultant decrease in habitat quality.

Biological impairment

The biological communities living in West Virginia streams are exposed to many stressors, including toxic contaminants, sedimentation, nutrient enrichment, and acid precipitation. The DEP uses benthic macroinvertebrates to assess the biological condition of streams in the state. These organisms provide reliable information on water and habitat quality in streams. They are extremely diverse and exhibit a wide range of tolerances to pollutants. Further, they serve as an excellent tool for



measuring overall ecological health, especially when summarized into a single index of biological integrity. In West Virginia, the health of benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams. The WVSCI is composed of six metrics (each measuring a different aspect of the community) that were selected to maximize discrimination between streams with known impairments and reference streams. Based on the WVSCI impairment threshold of 60.6 (0 –100 scale) WVSCI, about 29.27% of wadeable stream miles in the state are in poor condition (i.e. impaired), while 58.99% of stream miles are not impaired and 11.74% are inconclusive (Table 15). More than 43% (43.09%) of the wadeable stream miles in the Western Allegheny Plateau were impaired. In contrast, the Ridge and Valley and Central Appalachians ecoregions had substantially lower percentages (14.15% and 23.70%, respectively) of wadeable stream miles rated as impaired biologically.' Poorer habitat conditions in the Western Allegheny Plateau, especially those related to sedimentation, are likely to be at least partially responsible for the higher proportion of stream miles rated as impaired biologically.



Sources of bio-impairment

The results of the 2005 - 2009 probabilistic sampling revealed that 146 out of 530 samples received a WVSCI score of 60.6 or less. Benthic macroinvertebrate communities that score below this value are considered impaired, and the DEP would describe them as not supporting their aquatic life use designation.

Eleven categories of major sources of biological impairment were determined using water chemistry analyses, narrative descriptions by sampling personnel, benthic community characteristics, and several Geographic Information System data layers depicting land use activities. Each of the 146 sites was assigned a primary source of impairment from one of the 11 categories. For sites with possibly more than one source of impairment, the most obvious source was listed. Of the 146 bio-impaired sites, "unspecified land disturbance" affected almost 33 percent. Unspecified land disturbances are characterized by heavy sand and sedimentation associated with dirt roads, poor riparian zones, and highly eroded areas. The next highest sources of impairments are mining and agriculture.

Major Basin Summaries

Dunkard Creek

The DEP recently completed, and the EPA approved, Total Maximum Daily Loads for iron, fecal coliform, chloride and biological impairment related to sediment. The fish kills that occurred in in the fall of 2009 were a new development caused by golden algae (Prymnesium parvum) and its associated toxins.

The West Virginia Department of Environmental Protection and the West Virginia Division of Natural Resources, along with a number of other agencies, have investigated the cause of a substantial fish kill in Dunkard Creek, in Monongalia County.

Members of the public first reported seeing dead fish in Dunkard Creek and notified the DNR on September 1, 2009. At that time, staff from a variety of divisions from the DEP and the DNR visited the scene, began taking samples and started looking for a cause.

Because of mining activity in the area, the industry was an early suspect. In fact, after conferring with the DEP, Consol, which operates an active mine in Blacksville, W.Va., agreed to shut off its discharge into Dunkard Creek at its Blacksville No. 2 site. However, at the same time Consol was shutting off its pumps, dead fish were found upstream from its outlet, indicating that the outlet at that site is not the sole cause for the dead fish.

The agencies also received reports from area residents suspecting tanker trucks of dumping wastewater from oil and gas drilling activities into Dunkard Creek. Further investigation revealed those trucks that had been reported were withdrawing water from the stream, rather than dumping wastewater.

On Friday, September 18, 2009 staff members from the DEP flew over the area in a helicopter to see if there was anything they could see from the air that they missed on the ground. The staff noted the stream was clouded with a rust color from the Pennsylvania border upstream to a beaver dam in the South Fork of the West Virginia Fork of Dunkard.

In addition, investigators solicited the assistance of micro-biologists to help determine whether some form of algae or similar growth was a contributing factor. Toxins are sometimes produced by algae; and saline environments are sometimes involved with harmful algae blooms.

Additional water samples for golden algae taken on September 24, 2009 reconfirmed the presence of golden algae in amounts known to have caused fish kills in other states and countries. The DEP and other investigators have been assembling available scientific information on golden algae and the toxins it produces. As reported in available scientific literature, both the golden algae and the toxins it produces are influenced by environmental factors including the water's pH, temperature, salinity and nutrients. Toxin production mainly kills fish and appears to have little effect on cattle or humans.

Guyandotte River

The Guyandotte River is divided into upper and lower sections. The confluence of Island Creek and the Guyandotte River defines the boundary between the Upper and Lower Guyandotte watersheds - The impairments of the Upper Guyandotte River mainstem (fecal coliform, total iron and biological impairment) and the Lower Guyandotte River mainstem (fecal coliform, total iron) are addressed by TMDLs developed by EPA Region III in 2004. In that effort, EPA also developed TMDLs for numerous Guyandotte River tributaries predominantly impaired by mine drainage. Currently, there are 44 streams within the Upper Guyandotte Basin and 52 streams in the Lower Guyandotte Basin which are listed as biologically impaired and in need of TMDLs.

Kanawha River and major tributaries (New, Bluestone, Greenbrier, Gauley, Elk and Coal rivers)

The Kanawha River is divided into two major sections with the break occurring at the mouth of the Elk River. The Upper Kanawha Basin extends upstream to the confluence of the New and Gauley Rivers in Gauley Bridge. The Lower Kanawha Basin begins at the mouth of the Elk River and extends downstream to its confluence with the Ohio River in Point Pleasant.

The entire Kanawha River mainstem, Bluestone River and Bluestone Lake are listed as impaired because of fish consumption advisories related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs).

Fecal coliform impairments have been identified in portions of the Lower Kanawha River mainstem and in all of the major tributaries of the Kanawha River. Affected segments include the New River (mouth to Bluestone Dam), the Elk River (mouth to river mile 102.5), and the entire lengths of the Bluestone, Coal, and Greenbrier Rivers.

Previous EPA TMDL development efforts addressed dioxin impairments of the Lower Kanawha River and tributaries (September 2000) and metals impairments of the Elk River and tributaries (September 2001). The West Virginia Department of Environmental Protection finalized numerous TMDLs for impaired tributaries of the Upper Kanawha River in January 2005. Additionally, DEP developed TMDLs for the Coal River and numerous impaired tributaries that were approved by the EPA in September 2006. DEP also developed numerous TMDLs in the Gauley, New, Greenbrier and Bluestone watersheds in 2008.

Currently, all tributaries of the Lower Kanawha and Lower Elk, from Summersville Dam to the mouth, are being evaluated by the DEP for TMDL development. Once sampling and stressor identification are complete, all tributaries with impairments, other than ionic stress, will have TMDLs completed by December 2010 under the current schedule.

Monongahela River and major tributaries (Tygart and West Fork rivers)

Between March 2001 and September 2002, the EPA developed TMDLs addressing the iron, aluminum, manganese and pH impairments of the Monongahela, Cheat, Tygart and West Fork Rivers and numerous tributary waters.

Fecal coliform impairments have been identified in the Monongahela River (entire length), the Tygart Valley River (entire length), and the West Fork River (mouth to Stonewall Jackson Lake Dam). The same segment of the West Fork River is also biologically impaired and a consumption advisory related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs). Cheat and Tygart Lakes are listed for PCBs. The PCB listing of these lakes are based on elevated fish tissue concentrations and fish comsumption advisories. Recent fish tissue sampling has resulted in delisting of the Monongahela River for PCBs.

In Spring 2009, the DEP announced plans to develop TMDLs on all impaired tributaries of the Monongahela River from its beginning at the confluence of the West Fork River and Tygart River to the West Virginia/Pennsylvania border. Currently, water quality sampling and biological assessments are being conducted on all tributaries with known or suspected impairments. Once sampling is completed and all streams are assessed, the DEP will begin TMDL development for impaired waters. The DEP expects to submit the TMDLs to the EPA for approval by November 2012.

In March 2010, the DEP proposed a list of streams for TMDL development in the West Fork River Watershed. The streams were advertized in papers statewide seeking public input. A public meeting in the Summer of 2010 to present sampling plans and to address any questions or comments from the public. Pre-TMDL sampling began in July 2010 with draft TMDLs due to EPA by fall of 2013.

Cheat River Watershed TMDLs

The DEP and the EPA have initiated a large-scale revision of the Cheat River watershed TMDLs that the EPA developed in 2001. At present, pre-TMDL monitoring, impairment assessments, and source tracking and characterization activities have been completed and a work directive issued to perform water quality modeling. This effort is scheduled to be finalized in September 2010. The revision will involve re-evaluation of the metals and pH impairments associated with the 2001 TMDLs, in light of the aluminum and manganese water quality standard revisions that have occurred and the various water quality improvement projects in place throughout the watershed. In addition to the re-evaluation component, the new effort will also develop TMDLs for streams in the watershed where fecal coliform bacteria and/or biological impairments

have been identified. It is important to note that the pH water quality conditions of the Cheat River mainstem and Cheat Lake have shown dramatic improvement in recent times. The West Virginia Division of Natural Resources' limestone drum station on the Blackwater River and its application of limestone fines to headwater streams impacted by acid rain have restored many miles of trout water and pH data at the head of Cheat Lake has consistently indicated no impairment for the last four years. Several AMD restoration projects have also been completed in the watershed.

Little Kanawha River

A small headwater section from river mile 162 upstream to the headwaters is currently listed for pH impairment. The segment of the river from Burnsville Dam (river mile 132.6) downstream to the mouth is impaired by fecal coliform and has a fish consumption advisory for PCBs.

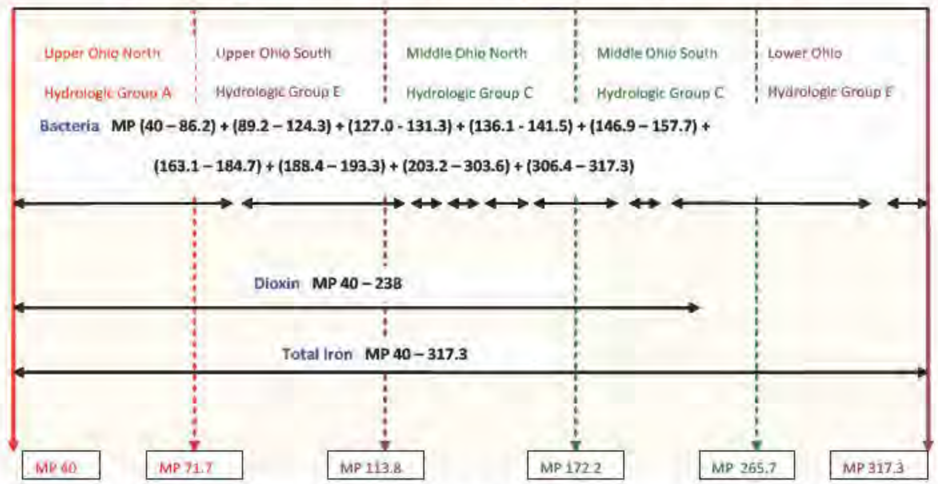
Previously, the EPA developed iron and aluminum TMDLs for the mainstem and several tributaries. The previously developed total aluminum TMDLs are now obsolete due to the criteria revisions that occurred in 2006. In addition, the DEP has received approval from the EPA for TMDLs on four additional tributaries (Copen Run, Duck Creek, Duskcamp Run and Lynch Run) for various impairments including: total iron, total manganese, pH and biological impairments.

Ohio River

In 2000 and 2002, EPA developed TMDLs for dioxin and PCBs, respectively for the Ohio River mainstem. The EPA TMDLs for dioxin included only sections of the Ohio River from the mouth of the Kanawha River downstream to the Kentucky state line. Additional sections of the river above the Kanawha River remain listed as impaired by dioxin. Currently, TMDLs have been or are being developed to address various impairments on many of the tributary streams.

The Ohio River Valley Water Sanitation Commission does extensive water quality monitoring of the Ohio River bimonthly. In addition, every two years, ORSANCO publishes a 305(b) report that provides assessments of the water quality based on ORSANCO water quality standards. As in the past, the DEP has reviewed the data and incorporated these assessments into the West Virginia Section 303(d) List.

Figure 3 - Impairments of the West Virginia section of the Ohio River



When both West Virginia and ORSANCO have an established criterion for a particular pollutant the most stringent standard is applied for assessment purposes and included in West Virginia's Section 303(d) List. For example, the bacteria impairment identified for various Ohio River segments is based upon both ORSANCO's E. coli. water quality criteria and West Virginia's fecal coliform criteria. In addition, the river continues to be identified as iron-impaired based upon the application of West Virginia's warmwater aquatic life criterion of 1.5 mg/l. Figure 3 depicts the impairments and segment lengths for the Ohio River bordering West Virginia.

Tug Fork River

In 2002, the EPA developed TMDLs for total iron and total aluminum for the Tug Fork River mainstem. In addition, total iron, total aluminum, total manganese and pH TMDLs were developed for its impaired tributaries. As noted earlier, subsequent revisions to the aluminum and manganese criteria have created uncertainty relative to the impairment status of affected waters and, as such, the validity of many the total aluminum and manganese TMDLs.

Currently, the Tug Fork is identified on the 2010 West Virginia Section 303(d) List for violations of the fecal coliform criteria and biological impairment. The fecal coliform impairment extends the entire length of the river and the biological impairment reaches from river mile 51.6 to the headwaters.

Interstate Water Coordination

Joint PCB monitoring and TMDL development effort with Virginia
DEP has been working with the Virginia Department of Environmental Quality (Va. DEQ) to assess Polychlorinated Biphenyls (PCBs) impairment along the Virginia section of the Bluestone River. The product of this cooperative effort will be a TMDL for the Bluestone River and tributaries with loadings and allocated reductions for sources in both Virginia and West Virginia. The USGS report detailing analytical method and sample results can be found at http://pubs.usgs.gov/of/2007/1272/pdf/OFR2007-1272.pdf. In addition, the DEP, Va. DEQ and EPA Region III have been cooperating in an effort to locate and reduce sources of PCBs to the Bluestone River. As part of this effort, remediation of the now defunct Lyn Electric Site in Bluefield, W.Va. has been completed. Efforts included leveling and removal of the electric motor remanufacturing buildings on the site. Also, contaminated water and debris were removed from the site and clean material used to backfill the open basement areas of the property. Within the watershed additional monitoring and source evaluation is on going to determine what steps need to be taken in the near future.

Ohio River Valley Water Sanitation Commission – ORSANCO
As with previous reports, the DEP's 2010 Integrated Report includes assessments based on data provided by ORSANCO. Throughout the development of ORSANCO's 2010 Biennial Assessment, the DEP has been involved with ORSANCO's efforts to standardize assessments among the "compact" states. The DEP's personnel continue to participate in several standing committees, along with representatives from other "compact states," charged with helping direct ORSANCO's water quality and biological monitoring efforts.

Chesapeake Bay
The Chesapeake Bay is impaired by nutrients and sediment from multiple sources originating locally and in upstream states. This biologically diverse waterbody is an important economic and recreational resource.

The need to restore this waterbody is a high priority for many agencies, organizations and the public in general. Fourteen percent of West Virginia's waters drain into the Potomac River and on into the Bay. In addition, portions of the James River Watershed in West Virginia contribute flow to the Bay.

In June 2002, Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding, committing West Virginia to the nutrient and sediment load reductions. The West Virginia Potomac Tributary Strategy, developed in November 2005, includes plans for nutrient and sediment reductions from a variety of state point and nonpoint sources. All other Bay jurisdictions have developed and are implementing similar plans. Many DEP programs are actively participating in the development of a Chesapeake Bay TMDL, which is scheduled to be completed in December 2010.

Interstate Commission on Potomac River Basin
The Commission is a non-regulatory agency of basin states (Maryland, Pennsylvania, Virginia and West Virginia), Washington, D.C. and the federal government. The Commission promotes watershed-wide solutions to the pollution and water resources challenges facing the basin and its more than 5.3 million residents. Examples of current commission efforts include the Chesapeake Bay Program involvement, stream biological assessments, support of selected stream gages, the Potomac Groundwater Assessment, Potomac Basin Drinking Water Source Protection Partnership coordination and Potomac Watershed Toxic Spill Model support. In addition, the Commission's public outreach program supports and helps coordinate an annual watershed-wide clean up effort and produces and distributes 150,000 copies of the newsletter Potomac Basin Reporter. The commissioners are appointed by their respective jurisdictions and provide policy guidance and oversight for a skilled staff of scientists and educators.

Ohio River Basin Water Resources Association
The association, in some form or another, was founded in 1981. The association works to: (1) provide a forum for Ohio River Basin states to study, discuss, and develop regional policies and positions on common interstate issues concerning water and related land resources; (2) coordinate to the extent possible water and related land resources planning in the Ohio River Basin; (3) provide representation of regional interest to the federal government; (4) investigate, study and review water related problems of the basin; (5) assist in water and related land resources training for basin representatives. The association welcomes membership from all states draining to the Ohio river including: Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia. Recently the organization has changed it name to the Ohio River Basin Water Resources Association and has signed a Memorandum of Understanding with ORSANCO to seek ways for the organizations to work together more efficiently.

Total Maximum Daily Load (TMDL) Development Process

From 1997 until 2003, EPA Region III developed West Virginia TMDLs under the settlement of a 1995 lawsuit, Ohio Valley Environmental Coalition, Inc., West Virginia Highlands Conservancy, et. al. v. Browner, et. al. The lawsuit resulted in a consent decree between the plaintiffs and the EPA that specifies TMDL development requirements and compliance dates. While the EPA was working on developing TMDLs, the DEP concentrated on building its own TMDL program. With the help of the TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL section within the Division of Water and Waste Management.

The TMDL section is committed to implementing a TMDL process that reflects the requirements of TMDL regulations, provides for the achievement of water quality standards, and ensures that ample stakeholder participation is achieved in the development and implementation of TMDLs. The DWWM's approach to TMDL development allows 48 months to develop a TMDL from start to finish. This approach enables the agency to carry out an extensive data generation and gathering effort to produce scientifically defensible TMDLs, and allows ample time for modeling, report drafting and frequent public participation opportunities.

The DEP's TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year, five-step process. The watersheds are divided into five hydrologic groups (A - E). Each group of watersheds is assessed once every five years. A map depicting the 32 watersheds and hydrologic groupings is provided as an attachment to this document before the List Key. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the NPDES permitting process and efforts toward limiting nonpoint source loading. Throughout the TMDL development process, there are numerous opportunities for public participation and input. Since its inception, the DEP's TMDL section pursued timely development of TMDLs for the waters and impairments identified in the consent decree between the EPA and the Ohio Valley Environmental Coalition, et. al. The TMDLs developed and approved in the Dunkard Creek, Upper Ohio River South, Youghiogheny, and Camp Creek portion of the Twelvepole Creek watersheds in 2009 fully accomplished the EPA's commitments under the consent decree.

The 303(d) list identifies and prioritizes the waters and impairments for which future TMDLs will be developed by specifying the year in the "Projected TMDL Year" column. The impaired waters intended for TMDL development in 2010, 2011 and 2012 are known and identified. For other waters and impairments, where the timing of TMDL development is less certain, the "Projected TMDL Year" is identified as the latest year where an opportunity exists per the DEP's plans to develop

TMDLs in concert with the Watershed Management Framework.

At any point in time, the DEP personnel is working on TMDLs in each of the five hydrologic groups (A-E). Each set of TMDLs moves through several stages of development prior to finalization and the EPA's approval. Table 17 shows the state's TMDL development progress.

The DEP's Web site contains all approved TMDL documents and the draft TMDL documents currently out for public comment. These documents can be found at http://www.dep.wv.gov/WWE/watershed/TMDL/Pages/default.aspx.

Table 17 - West Virginia TMDL development progress

Hydrologic Group	Watersheds	Progress
E1	Dunkard Twelvepole Upper Ohio South	U.S. EPA approved in 2009
A1	Youghiogheny	U.S. EPA approved in 2009
A2	Cheat	Allocation development process underway Draft TMDLs expected summer 2010
B2	Elk Lower Kanawha North Branch of the Potomac	In model development process draft TMDLs expected fall 2010
C2	Middle Ohio North Middle Ohio South	In model development process Draft TMDLs anticipated in 2011
D2	Monongahela	Pre-TMDL monitoring and source characterization ongoing (July 2009 - June 2010)
E2	West Fork (tentative)	Stream selection was advertised in March 2010

Water Pollution Control Programs

Division of Mining and Reclamation

The mission of the Division of Mining and Reclamation (DMR) is to regulate the mining industry in accordance with federal and state law. Activities include issuing both National Pollutant Discharge Elimination System and Surface Mining Control and Reclamation Act permits for mineral extraction sites and related facilities, inspecting facilities for compliance, monitoring water quality, tracking ownership and control, and issuing and assessing violations. The DMR is responsible for the computer databases that track the DMR's activities - Environmental Resources Information System and Applicant Violator System the federal database. The Permitting Unit is responsible for reviewing permit applications for surface and underground coal mines, preparation plants, coal loading facilities, haulage ways, and coal-related dams. This unit also reviews permit applications for non-coal quarry operations (sand, gravel, limestone, etc). Permit review teams staffed with geologists, hydrologists, engineers and others are located in each regional office throughout the state and in the headquarters office. The DMR's Inspection and Enforcement unit is responsible for inspecting all coal mining and quarry operations in the state. It enforces compliance through regular inspections and Notices of Violation, and ensures site reclamation through final release of the operation. This unit is also responsible for civil penalty assessments, show cause proceedings, bond forfeiture and collection. The DMR's Program Development unit is responsible for implementing a proactive approach to policy issues, legislation and training. This unit is designed to keep the Division staff current with technological advances and to provide clear direction through development of cogent policy and guidance to meet legal and regulatory requirements. This unit provides regulatory interpretation and support to field offices, develops and updates handbooks and forms, drafts legislation and initiates regulation changes. Other responsibilities of this unit include Small Operators Assistance Program, public relations, including responses to Freedom of Information Act requests, special projects, employee training and research of laws, regulations and policy.

Division of Water and Waste Management

The Division of Water and Waste Management's mission is to preserve and enhance West Virginia's watersheds for the benefit and safety of all.

The DWWM strives to meet its mission through implementation of programs controlling surface and groundwater pollution caused by industrial and municipal discharges as well as oversight of construction, operation and closure of hazardous and solid waste and underground storage tank sites. In addition, the division works to protect, restore and enhance the state's watersheds through comprehensive watershed assessments, groundwater monitoring, wetlands preservation, inspection and enforcement of hazardous and solid waste disposal and proper operation of underground storage tanks.

Environmental Enforcement (EE) is a branch of the Division of Water and Waste Management charged with assuring compliance with many of the state pollution control regulations. EE promotes compliance with the Solid Waste Management Act, Water Pollution Control Act, Groundwater Protection Act, Hazardous Waste Management Act, Underground Storage Tank Act, and Dam Safety Act by providing assistance, inspecting regulated sites, and enforcing conditions required by these acts.

National Pollution Discharge Elimination System (NPDES) Program

The DWWM's primary mechanism for controlling point sources is the West Virginia NPDES permitting program. This program, administered by the Permitting Branch, regulates activities and facilities involved in the installation, construction, modification, and operation and maintenance of wastewater treatment systems as well as their discharges. Individual and general permits are used to implement the program. Most permits include effluent limits and requirements for facility operation and maintenance, discharge monitoring and reporting. Other permits require the installation and implementation of best management practices in lieu of effluent limitations and discharge monitoring requirements. The Permitting Branch also administers a pretreatment program in conjunction with the NPDES program, which outlines procedures for regulating proposed industrial wastewater connections to publicly owned treatment works. The program imposes discharge limitations for indirect discharges and requires the installation of pretreatment facilities where necessary to prevent interference with POTW operations and sludge disposal practices and to ensure that the pollutants contributed by industrial users do not pass through the POTW and violate water quality standards. The National Combined Sewer Overflow (CSO) Policy is implemented as a component of the NPDES Permits for POTWs with CSOs. The DEP is also working with several state and federal agricultural agencies to develop a Concentrated Animal Feeding Operation (CAFO) permitting program. Activities administered by the Permitting Branch include the regulation of industrial solid waste landfills and the land application of sewage sludge, and developing wasteload allocations for new or expanding sewage treatment facilities. Below is a list of permit actions for the time period beginning in July 2007 and ending in June 2009.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
Report Date 02/12/2010

NPDES PERMITTING - PERMIT ACTION REPORT (7/1/2007 - 6/30/2009)

	Applications Received This Period	Applications Denied this Period	Permits Registrations and Modifications Issued This Period	Permits Registrations and Modifications Issued Year-to-Date for Current Fiscal 2010	Withdrawn and Voided This Period	Applications Pending as of 6/30/2009: Greater Than 180 dep days	Less Than, 180, > 90 dep days	Less Than, Equal to 90 dep days	Total (dep days)	Greater Than 180 total days	Average DEP Time to Issue Permits This Period (In Days)	Average Total Time to Issue Permits This Period (In Days)
INDIVIDUAL PERMITS	214	0	216	65	2	13	14	26	53	21	164	180
GENERAL PERMITS												
Home Aeration Units	590	2	556	1081	14	0	0	68	88	53	18	44
Sewage General	27	0	27	12	1	0	0	12	12	9	98	146
Storm Water Construction	1316	0	1285	317	30	0	1	68	69	12	27	33
All Others	937	1	517	670	20	1	6	441	449	59	81	141
MODIFICATION PERMITS	410	2	367	93	36	14	8	54	76	31	73	84
TRANSFER PERMITS	342	0	330	31	10	1	1	27	29	9	17	36
TOTAL - PERMITS	3835	5	3300	2269	113	29	30	716	775	194		

NOTE: The permits used to calculate for the "Average DEP Time" column are those that were submitted after June 30, 1999, when ERIS was deployed for Division of Water and Waste Management.

In addition to permitting, compliance assessment and enforcement activities are coordinated between the Permitting Branch and Environmental Enforcement. Noncompliance is initially addressed by administrative actions to compel compliance. These may include warning letters, notices to comply, enforcement orders, or referrals for civil action.

Nonpoint Source Control Program

The Nonpoint Source Control Program focuses on restoration and protection of streams from nonpoint source pollution. The program assesses nonpoint source impacts, then develops and implements watershed based plans and projects designed to reduce pollutant loads from agricultural, silviculture, resource extraction, urban runoff, construction activities, and failing septic systems. Program initiatives are based upon education, technical assistance, financial incentives, demonstration projects, and enforcement, as necessary. The division's Nonpoint Source Program supports overall administration and coordination of the nonpoint source activities through these participating state agencies: the West Virginia Conservation Agency, the Office of Oil and Gas, and the Division of Health and Human Resources. Each year, specific activities are funded under the Nonpoint Source Program. Many of the streams being listed on the state's list of impaired waters are affected by nonpoint sources. The majority of the Total Maximum Daily Loads being developed involve nonpoint source water quality impacts. To more effectively respond to TMDL implementation needs, the Nonpoint Source Management Plan was updated in 2000 to incorporate watershed management principles, including integration of TMDL and Watershed Management Framework scheduling. Since then, the Nonpoint Source Program has developed 16 watershed based plans that address a variety of nonpoint sources of pollution. These plans are developed in cooperation with the stakeholders, including federal, state and local government agencies, within the watershed. As a result of these plans, numerous nonpoint source remediation projects for acid mine drainage, agriculture, streambank erosion, and dirt roads have been undertaken. The goal of the watershed based plans is to restore the impaired streams to meet water quality standards. The successes to date emphasize the need to focus more resources on voluntary installation of best management practices in identified priority watersheds where local stakeholders are interested in making a difference.

Groundwater Program

Under the Groundwater Protection Act, West Virginia Code Chapter 22, Article 12, Section 6.a.3, the DEP is required to provide a biennial report to the Legislature on the status of the state's groundwater and groundwater management program, including detailed reports for each agency that has groundwater regulatory responsibility. The current biennial report to the Legislature covers the period from July 1, 2007 through June 30, 2009. Copies of the report "Groundwater Programs and Activities: Biennial Report to the West Virginia 2010 Legislature" may be obtained by contacting the Groundwater Program at the Division of Water and Waste Management, 601 57th St., Charleston, WV 25304 or by calling (304) 926-0495. The report also may be reviewed at http://www.dep.wv.gov.

The Groundwater Program is responsible for compiling and editing information submitted for the biennial report. The DEP, the West Virginia Department of Agriculture and the West Virginia Department of Health and Human Resources all have groundwater regulatory responsibility and contribute to the report. These state boards and six standing committees currently share the responsibility of developing and implementing rules, policies and procedures for the Ground Water Protection Act (1991). The Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Nonpoint Source Coordinating Committee are the standing committees. The report provides a concise, thorough overview of those programs that are charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia.

The Ambient Groundwater Quality Monitoring Network was established by the DWWM in cooperation with the USGS in 1992 and is an ongoing project. The network provides critical data needed for proper management of West Virginia's groundwater resources. The major objective of this USGS study is to assess the ambient groundwater quality of major systems (geologic units) within West Virginia and to characterize the individual systems. Characterization of the quality of water from the major systems helps to:

- Determine which water quality constituents are problems within the state
- Determine which systems have potential water quality problems

- Assess the severity of water quality problems in respective systems
- Prioritize these concerns

Only by documenting present ambient groundwater quality of the state's major systems can regulatory agencies assess whether water quality degradation has occurred in certain areas and whether potential degradation is a result of natural processes or those associated with human activity. Spatial variability in water quality is determined for specific geologic units based on sampling of approximately 30 wells annually. The sampling continues over a period of approximately six years and provides a database of more than 200 wells from which comprehensive water samples are collected. Wells are selected in specific drainage basins in given years, rotating annually to new basins, thus providing sampling of groundwater in all watersheds of the state over the five year period. Then, the cycle of sampling begins again. All associated groundwater quality data for each well sampled and summaries of groundwater quality for each respective watershed are published in the USGS Water Resources Data for West Virginia annual report.

Cost Benefit Analysis

A true cost/benefit analysis on the economic and social costs and benefits of water pollution control is a difficult and time consuming task. Particularly, the evaluation of industrial facilities would be a monumental task considering the various types of industry (mining, chemical, power generation, etc), each having a very different process of pollution control. However, the information contained in the following paragraphs provides an idea of the amount of money currently expended to construct and upgrade both the municipal facilities within the state as well as programs available to homeowners wanting to correct failing onsite sewage systems.

Funding for Water Quality Improvements

The DEP is responsible for administering a combination of state and federal funds expended for projects to improve water quality in state streams. The following narrative provides an overview of the programs within the DEP's Office of Water and Waste Management that provide funding for water quality improvements and a summary of the funds dispersed between July 2007 and June 2009 to improve water quality.

Clean Water State Revolving Fund Program

Clean Water State Revolving Fund (CWSRF) program is a funding program administered by the State Revolving Fund Branch to address water quality problems through wastewater facility construction, upgrades, or expansions. The branch is charged with general oversight, fiscal management and administrative compliance review of local governmental entities that receive funds and provides information and guidance on what administrative actions are needed to process a loan through the program. When a community has been recommended by the West Virginia Infrastructure and Jobs Development Council to seek CWSRF program funding for financial assistance, the community is contacted by a financial manager. A meeting may be scheduled to advise the community leaders about the overall program requirements and specifically what they should do next to obtain a CWSRF loan. There are federal, state, and program requirements that must be met prior to scheduling a loan closing. The CWSRF currently has three financial assistance programs available. These programs are described below.

Low Interest Loan Program

A low interest loan program for construction of municipal wastewater treatment works is available for municipalities and public service districts to build, upgrade, or expand treatment facilities and collection systems. Conventional loans with a repayment period of 20 years are available with an interest rate and annual administrative fee not exceeding 3% for certain communities. Loans with repayment periods from 21 to 40 years are available for disadvantaged communities where financial affordability is an issue. The interest rate and annual administration fee on these loans do not exceed 1/2%. From July 2007 through June 2009, 35 wastewater treatment facility loans totaling $85,807,285 were funded.

Agriculture Water Quality Loan Program
The Agriculture Water Quality Loan Program is a partnership with the West Virginia Conservation Agency developed to address pollution from nonpoint sources using Best Management Practices approved by the U.S. Environmental Protection Agency. CWSRF money is loaned to participating banks so they can offer below market rate low interest loans to qualifying applicants. For more information, contact your local Conservation District office, http://www.wvca.us/directory/cdo.cfm. From July 2007 through June 2009, 31 nonpoint source agriculture BMP loans totaling $1,615,118 were funded.

Onsite Systems Loan Program
In cooperation with the West Virginia Housing Development Fund, a low interest loan program has been established to address onsite sewage disposal problems. Called the "Onsite Systems Loan Program," loans up to $10,000 are available to replace malfunctioning septic systems and to install new onsite sewage systems for homes that have direct sewage discharges to ditches and streams. Centralized treatment for these homes will not be available in the next five years. For the current reporting period of June 2007 through June 2009, a total of 62 systems were funded at a cost of $407,409.

In conclusion, although funding for maintenance and improvement of water quality is often a controversial issue, the DEP recognizes that millions of dollars are expended annually by businesses, municipalities, private and public entities (including state and federal agencies) to improve and maintain water quality in West Virginia. These expenditures address pollutants from various media including solid and hazardous waste, air and water.

Public Participation and Responsiveness Summary

The draft Section 303(d) List was advertised for public comment from March 15, 2010 through May 19, 2010. This period included a 30-day extension granted by the agency after requests for additional time to fully develop comment submissions were received from multiple entities. Legal notices of the availability of the draft document were placed in newspapers statewide, including requests for public comment. The draft document was promoted via news release, e-mail and the Internet. At the conclusion of the public comment period, the DEP considered all comments and made adjustments to the list where appropriate.

Table 18 identifies all entities that provided comments. All relavant comments have been compiled and responded to in this responsiveness summary. The DEP appreciates the efforts commenters have put forth to improve West Virginia's listing and TMDL development processes. Comments and comment summaries are bold and italicized. Agency responses appear in plain text.

Table 18 - 2010 Section 303(d) List Commenters

Argus Energy WV, LLC	Patriot Coal	Linda Lee Elliston Emrich
ICG Beckley, LLC	PPG Industries	City of White Sulphur Springs
Town of Ronceverte	Arcelor Mittal	West Virginia Manufactors Association
Tunnel Ridge, LLC	Arch Coal, Inc.	West Virginia Chamber of Commerce
Arthur W. Dodds	Pamela C. Dodds	West Virginia Coal Association
Duane Nichols	Hunter Ridge	American Electric Power
Kim Shiemke	Tom Danek	

The following issues were raised by commenters relating to the listing of numerous state waters for mercury:

- ***The use of total mercury fish tissue results to assess a methyl mercury criterion.***
- ***The use of fish tissue fillet results to assess to assess a total organism body burden criterion.***
- ***The lack of a demonstrated > 10% rate of exceedance for methyl mercury in the most recent sampling of fish from the Kanawha River.***
- ***The use of individual composite sample results rather than a trophic level weighted geometric mean for assessing impairment.***
- ***The use of ORSANCO's total mercury data and more restrictive 0.3 ug/g standard to assess methyl mercury impairment on the Ohio River.***

The existing mercury listings for West Virginia waters were based on total mercury sample results from composites of fish fillets. Previous listings were based on the EPA guidance recommending states could equate total mercury levels in fish tissue to methyl mercury levels. In the guidance, the EPA suggested that total mercury concentrations in fish tissue could be assumed to represent methyl mercury concentrations for the purpose of listing. Language from the EPA document Water Quality Criterion for the Protection of Human Health: Methylmercury (2001) states in part "the MSRC concluded, based on research conducted by Bloom (1992) and Morgan et al. (1994), that over 90% of the mercury present in fish and seafood is methyl mercury. Thus, total mercury concentrations are considered appropriate for evaluation of methyl mercury exposure in human populations."

However, the DEP recognizes that proper assessments must be made in accordance with approved water quality standards. In the case of mercury, comments correctly point out that the criterion calls for whole fish samples, analyzed for methyl mercury. Studies were provided indicating mercury concentrations in fillets may be higher than those in whole body samples and that the methyl mercury to total mercury ratio in fish tissue may not be as high as the EPA's general statements indicate. As such, the DEP cannot conclude that the standards have been properly applied, and will remove existing listings for mercury.

The DEP is in the second year of a two-year study to evaluate statewide advisories for mercury and will analyze a percentage of fish collected for both methyl and total mercury to determine an appropriate ratio for future assessment purposes. However, all current fish consumption advisories will remain in place.

As the agency is proposing delisting of mercury impairments based upon the total/methyl and fillet/whole body issues, the requests for delisting based upon exceedence frequency and averaging are moot at this time. However, the DEP does not agree that the listing methodologies for water column numeric criteria would be appropriate for consideration of fish tissue results. The EPA mercury implementation guidance relative to trophic level weighting will be considered in future assessments.

The Ohio River listings were included to honor the initial draft assessments made by ORSANCO for portions of the Ohio River. The DEP has since been informed by ORSANCO of its plan to change the original assessments for mercury and proceed with additional sampling to better understand the relationship of total to methyl mercury for Ohio River fish. As such, the DEP has also removed the Ohio River mercury listings from the draft list.

Two commenters requested the removal of the CNA-Algae listing for the Greenbrier River (WVKNG). One commenter stated that the condition "does not constitute a danger at this time." The second commenter stated that they believe "the river is not failing to meet its designated uses."

The DEP does not agree with these comments. As described in the Narrative Water Quality Criteria - Greenbrier River Algae section of this document, the DEP believes that the excessive growth of algae does constitute a loss of designated uses for the listed segment of the Greenbrier River. The DEP has determined the existence of conditions prohibited by 47 CSR 2 Section 3.2 and causation by a pollutant. The state's Environmental Quality Board in a recent ruling (Appeal Nos. 09-05-EQB and 09-08-EQB) called the problems in the Greenbrier River undeniable and stated that designated uses have been jeopardized. As such, the DEP is retaining the Greenbrier River listing.

The classification of Big Sandy Creek (WVMC-12) as a trout stream was disputed because it is not listed in Appendix A of 47 CSR 2 and is not believed to be a cold water fishery. The delisting of iron, dissolved aluminum and pH impairments was requested.

The commenter correctly stated that available water quality monitoring data for Big Sandy Creek does not indicate impairment pursuant to dissolved aluminum criteria for warmwater fisheries and that Big Sandy Creek is not included in Appendix A of 47 CSR 2. Appendix A is not a comprehensive lists of trout waters and the DEP applies the trout water designated use and associated criteria to any stream believed to meet the definition at 47CSR2 – 2.19:

> *"Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.*

Alternatively, a stream that currently does not support year-round trout populations may also be properly classified as a trout water if that use was documented to be an existing use pursuant to the definition of "Existing uses" at 47CSR2 – 2.6 and the Tier 1 protection requirements of the Antidegradation Policy at 47CSR 2 – 4.1.a:

> *(2.6) "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included in the water quality standards.*
>
> *(4.1.a.) Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.*

When classifying trout waters, the DEP relies heavily on the guidance of the Division of Natural Resources. After receipt of the comment, the DEP reviewed available documentation and consulted with the Division of Natural Resources. Both agencies agree that Big Sandy Creek is more appropriately classified as a warmwater fishery. As such, the dissolved aluminum (trout) impairment was removed from the list. Iron and pH impairments remain indicated as "TMDL Rev." because existing

TMDLs previously developed by the EPA are being reevaluated in the Cheat River Watershed TMDL development project. Within that project, reevaluation will be based upon the criterion for warmwater fisheries.

Two commenters requested delisting of the iron impairments of the Ohio River. The following issues were raised:

- **Available data for certain pools does not demonstrate a greater than 10% rate of exceedance**
- **Available data at certain locations indicates no violations in the past two years**
- **The great majority of the iron in the Ohio River (Upper North) is naturally occurring and due to runoff of surface soils into the River**
- **Iron concentrations in the Ohio River (Upper North) do not pose a threat to human health or aquatic life and do not demonstrate that an impairment exists.**

In the West Virginia 2008 Section 303(d) List, the entire length of the Ohio River is listed as impaired for iron. Delisting requires adequate documentation that the impairment no longer exists. The data available for assessment is generated by ORSANCO and includes multiple locations. The WVDEP's listing methodology is point-based rather than pool-based.

Over the five year assessment period for the 2010 Draft 303(d) List, a greater than 10% rate of exceedance of the West Virginia iron water quality criteria was observed at mile points 42.6, 84.2, 126.4, 203.9 and 341. A less than 10% rate of exceedance was observed at mile points 54.4, 161.8 and 279.2. The West Virginia listing methodology extends an impaired condition in both directions until a non-impaired condition is observed. Based on that methodology, the entire length of the Ohio River is impaired for iron.

The listing methodology provides flexibility to override a five year assessment if no violations are observed in the most recent two-year period and the agency is convinced the impairment no longer exists. One commenter correctly stated that no iron violations are observed at mile point 84.2 from July 2007 to June 2009. However, the agency is not convinced that monitoring during that period confirms a non-impaired condition. Monitoring at mile point 84.2 on March 17, 2010 revealed a total iron result of 3.296 mg/l. In addition, further examination of the Ohio River data obtained from ORSANCO indicates a positive relationship between total suspended solids (TSS) and total iron. The relationship shows that as TSS values rise there is a corresponding increase in total iron values. Samples obtained in the last two years have not captured TSS values reaching the levels noted in previous samples with iron violations. As such, the DEP cannot state with confidence that the current iron levels in the Ohio River no longer violate water quality criteria. In the evaluation performed in response to these comments, the DEP determined that it erred when proposing delisting of a portion of the lower segment of the Ohio River and is retaining the entire length impairment of the 2008 list.

The DEP is aware that iron is present in native soils and sediment from numerous sources can cause violations of the water quality standards. However, the current EPA approved water quality criteria for West Virginia is total iron and according to federal regulations must be used in assessing waters for Clean Water Act purposes. The DEP does not have conclusive information that observed iron concentrations in excess of criteria are naturally occurring. The 2010 Draft Section 303(d) List must be based on effective water quality standards, which currently do not include a site-specific criterion for iron in the Ohio River.

Several commenters requested that DEP implement a Total Dissolved Solids (TDS) standard to protect the environment.

West Virginia does not currently have a TDS standard applicable to its waters. Without a standard, the DEP cannot list a stream on the impaired streams list for TDS. A TDS criterion has been recommended in the state's triennial review of water quality standards.

A perceived lack of action by the DEP was expressed in regard to several streams in the Dunkard and Monongahela watersheds that the

commenter believes are impaired.

The DEP has previously listed many of the streams/impairments noted in the comment and the EPA and/or the DEP have developed TMDLs as identified in Supplemental Table B. The DEP is currently pursuing a new TMDL development project for impaired tributaries of the Monongahela River. This effort will reevaluate TMDLs developed by the EPA in 2002 and will also address newly identified impairments. A comprehensive "Pre-TMDL" monitoring program has just been accomplished but was not available for assessment in the 2010 cycle. This data is being assessed now and identified impairments will immediately proceed to TMDL development. The impairments will be identified on the 2012 303(d) list and TMDLs are planned to be finalized by December 31, 2012. In summary, all waters named by the commenter either have or are having TMDLs developed.

A commenter requested that "the DEP recognize and emphasize the role of sediment and turbidity as causes for stream impairment." The commented also requested NPDES permitting and enforcement program enhancements to restrict discharges of storm water associated with construction activities in sensitive areas.

The DEP recognizes the role that sediment plays in stream water quality. Elevated suspended solids can be associated with exceedances of total iron water quality criteria and sedimentation is often determined to be a significant stressor of biologically impaired streams when TMDLs are developed. However, stream-specific cause and effect relationships cannot be accurately determined with the limited information that is available at the time of listing. In the TMDL development process, streams listed for iron and/or biological impairment undergo evaluation of sediment contributions both from upland sources and streambank erosion. After extensive modeling, TMDLs establish allocations for existing point and nonpoint sources that are necessary to restore designated uses. The Construction Stormwater General Permit requires application of Best Management Practices (BMPs) that are designed to minimize water quality impacts. TMDLs also address new discharges and include requirements that limit the amount of disturbed area concurrently registered under the Construction Stormwater General Permit.

Multiple commenters stated that the WVSCI is an inappropriate mechanism for assessing narrative criteria because it has not been promulgated as a water quality standard by the West Virginia Legislature and has not been subject public notice and comment.

The basis for biological impairment listings is the narrative water quality criterion at Title 47 Series 2 Section 3.2.i of the Code of State Rules, which prohibits significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. This narrative criterion is a valid water quality standard that was promulgated by the West Virginia Legislature and approved by the EPA.

Under the Clean Water Act and implementing regulations, the DEP must assess State waters with respect to attainment of water quality standards via comparison of available information to both numeric and narrative water quality criteria. The DEP initiated biological integrity assessments in the 1998 Section 303(d) list. The WVSCI was first used in the 2002 Section 303(d) listing process and has remained as an integral component of all subsequent 303(d) lists. The DEP's position has not changed relative to its responsibility to list waters where available data indicates significant adverse impact to their biological components. Furthermore, list approval by the EPA is expected to be contingent upon our continued implementation of this practice.

The WVSCI was specifically designed to accomplish assessment with respect to the 47CSR2 - 3.2.i criterion and remains the best scientific tool available to the DEP for that purpose. It was developed for the EPA and the DEP by national experts in the assessment of biological integrity through the evaluation of benthic macroinvertebrate communities. It is similar to the multi-metric indices used by many states and its component metrics are both validated and widely used nationally when assessing biologic health of aquatic systems.

Over the long period of WVSCI application, there have been numerous

opportunities for public notice and comment. Prior to the 2010 effort, the WVSCI has been applied in four West Virginia Section 303(d) lists and each of those processes included public notice and comment provisions. Previous Section 303(d) lists have generated public comments relative to biological impairment and application of the WVSCI. The DEP conscientiously considered and responded to all such comments. The EPA reviewed public comments and the DEP responses and, in their list approvals, concluded that the DEP properly assessed biological data and properly considered and responded to public comments.

A commenter contended that the DEP's sole reliance on the WVSCI methodology constitutes an improper evaluation of the overall biological integrity of an aquatic ecosystem which requires a more comprehensive assessment to include habitat and fish populations. The following excerpt from DEP Cabinet Secretary Randy Huffman's June 25, 2010 testimony to the Senate Committee on Environment and Public Works, Subcommittee on Water and Wildlife was also included to support the comment:

> ***These tools are just that, tools. They are not stand alone determinants of compliance with the narrative criterion. Any application of these assessment tools in determining compliance with the narrative criterion must faithfully apply the language of the standard itself, which prohibits significant adverse impacts on the biological component of the aquatic ecosystem.***

The commenter also included excerpts from a recent resolution of the West Virginia Legislature and suggested that the use of WVSCI "wholly disregards the Legislature's mandate as expressed in House Concurrent Resolution No. 111 and simultaneously betrays the very spirit and intent of the WVWPCA."

In reference to Secretary Huffman's Senate testimony, the commenter omitted text that is contextually important. The theme of the paragraph disputed conclusions that result from application of the draft GLIMPSS methodology. Preceding the excerpted text, the paragraph clearly indicates two points: GLIMPSS has not been put into regulatory use and the DEP uses the WVSCI to assess biological integrity under the narrative water quality criterion. The concluding sentence of the paragraph states:

> *In that regard, the WVDEP considers streams with less than 60.6 as biologically impaired.*

The DEP's use of WVSCI to assess 47CSR2-3.2.i is consistent with the Secretary's testimony.

House Concurrent Resolution No. 111 was directed to the United States Environmental Protection Agency in response to federal guidance suggesting conductivity measurement to gauge potential to violate narrative requirements. Nonetheless, the DEP's use of WVSCI to assess 47CSR2-3.2.i is consistent with the Resolution. WVSCI is an Index of Biological Integrity (IBI) for benthic macroinvertebrates. Benthic macroinvertebrates are aquatic life and afforded Clean Water Act protection. Failing WVSCI scores indicate nonsupport of the aquatic life designated use and nonattainment of the narrative criterion at 47CSR2-3.2.i. Under WVSCI, benthic macroinvertebrates are evaluated to determine the balance of the aquatic community. Multiple metrics measure species diversity, with favorable scores indicating the community "is diverse in species composition" and "the aquatic community is not composed of only pollution tolerant species." Favorable scores also demonstrate assemblages that are sufficient to perform biological functions necessary to support fish communities. The DEP has not developed or implemented a fish IBI for West Virginia waters. While a fish IBI might be useful in non-wadeable streams or other habitats that do not support the WVSCI protocol, fish community assessment is not a prerequisite or substitute for benthic macroinvertebrate assessment in habitats that support the WVSCI protocol. In fact, WVSCI assessment indicating impairment provides evidence of ecosystem imbalance and adverse impact to higher trophic level organisms.

The Legislature resolved that interpretation of narrative water quality standards is the responsibility of the DEP and that interpretation must

faithfully balance the protection of the environment and economic development. The DEP's historic and continued use of WVSCI to scientifically assess attainment of water quality standards does not violate the Legislature's statement of public policy as contained the West Virginia Water Pollution Control Act.

General and stream-specific comments were received suggesting the DEP should not use a single biological sampling event to list a stream as biologically impaired. The following streams were requested to be removed based on a single WVSCI sample: unnamed tributary (unt) of Birds Creek (WVMT-12-H-1), Hackers Creek (WVMT-26), Buffalo Creek (WVPSB-5), Parker Branch (WVO-2-Q-18-D) Maynard Branch (WVO-2-Q-23).

Given the magnitude of the DEP's responsibilities for watershed assessment, it would not be practical to demand multiple biological monitoring events at a single location prior to assessment. The design of the WVSCI allows an individual sample, qualified as comparable per its methodology, to discriminate departure from the reference condition and to be used for impairment decisions pursuant to the narrative criterion of 47CSR 2 - 3.2.i. The DEP has used this methodology to make assessment decisions on hundreds of single samples events over the last ten years in previous 303(d) lists with each list receiving the EPA approval.

The DEP does not conduct a biological assessment when suspect conditions jeopardize the validity of assessment under the WVSCI. For example, if it is known that streams have been dry for extended periods or have been scoured by a recent flood, the DEP does not perform biological monitoring. Additionally, to be considered comparable, the depth of sample areas cannot be greater than the height of the net and the flow must be sufficient to carry dislodged macroinvertebrates into the net. All biological monitoring data is extensively screened for comparability to WVSCI thresholds before it is used.

One commenter provided references to the Programmatic Environmental Impact Statement for Mountaintop Mining and Valley Fills in Appalachia (MTM/VF EIS), a supplemental study supplied by a member of the coal industry, and an academic study published after the MTM/VF EIS. The commenter contended that the referenced documents show that mountain top mining and valley fills do not cause biological impairment and therefore, the DEP's assessment of biological impairment through the use of the WVSCI is flawed. Based upon the supplemental studies, the commenter characterized the WVSCI as a "measure of change, not impairment" and opined that "a mere shift" in the biological community should not be equated to impairment because the designated use of the stream remains viable.

The following reference to the MTM/VF EIS was provided:

> ***Further, the EIS studies did not conclude that impacts documented below MTM/VF{mountaintop mining / valley fill} operations cause or contribute to significant degradation of waters of the U.S. (Programmatic Environmental Impact Statement. Corps, EPA et.al. Pg. II. D-9).***

The overwhelming majority of biological impairment listings in the 2010 West Virginia Section 303(d) List do not have associated sources identified and, in no instances, are the specific mining activities evaluated in the MTM/VF EIS identified as source of biological impairment. More importantly, the referenced statement, extracted from thousands of pages of documentation, does not wholly reflect the findings of the MTM/VF EIS. The MTM/VF EIS clearly recognizes biological impairment in certain waters downstream from evaluated mining activities, as evidenced by the following language that is contained within the same paragraph as the referenced statement:

> *Biological conditions in the streams with only valley fills represented a gradient of conditions from poor to very good; streams with valley fills and residences were most impacted. Impacts could include several stressors, such as valley fills, residences, and/or roads.*

The recognition of biological impairment is also evidenced in the

Responses to Comments section of the MTM/VF EIS:

> *Studies do indicate that aquatic communities downstream of surface coal mining operations and valley fills are impaired in some cases. Certain chemical parameters (sulfates, specific conductance, selenium) are sometimes elevated downstream of mining or valley fills. Stream reaches below mining and valley fills may have changes in substrate particle size distribution from increased fine material due to sedimentation. Some macroinvertebrate communities change in terms of diversity, population size, and pollution tolerance. However, the sample size and monitoring periods conducted for the PEIS were not considered sufficient to establish firm cause-and-effect relationships between individual pollutants and the decline in particular macroinvertebrate populations. Impairment could not be correlated with the number of fills, their size, age, or construction method. See Section II.C. Action 5 in the PEIS recognizes the value of continued evaluation of the effects of mountaintop mining operations on stream chemistry and biology.*

In regard to the supplemental studies, the MTM/VF EIS clearly indicates that the opinions and views expressed by the individual authors of referenced studies do not necessarily reflect the position or view of the agencies preparing the EIS. The DEP does not interpret the cited studies as demonstrations of universal biological integrity in streams below evaluated activities and disagrees with the commenter's characterization of the WVSCI. A "shift" in the benthic macroinvertebrate community of a stream can constitute biological impairment pursuant to 47CSR2 – 3.2.i, and the WVSCI (recognized as a "best science method" in the MTM/VF EIS) provides a sound scientific basis for assessment.

A commenter expressed the concern that "in many cases, the specific data relied upon by DWWM is inadequate and/or deficient" stating that "during metric development for the WVSCI, consideration of individual metrics did not include an evaluation of metric variability." The commenter also contends that biological impairment determinations should not be made based upon a single assessment because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment."

WVSCI variability has been measured and addressed in the listing methodology. Duplicate sampling (two samples collected at the same location and time) has been a routine component of the DEP's biological monitoring program since the initiation of WVSCI implementation. The observed variability forms the basis for a precision estimate that, in turn, creates the "gray zone" concept that is applied in the listing methodology for biological impairment. Streams with WVSCI scores falling below the true impairment threshold of 68 (5th percentile of reference) and above 60.6 (5th percentile of reference minus the precision estimate) are not initially listed but are targeted for re-evaluation. Because a gray zone WVSCI result does not provide sufficient information for classification of aquatic life use attainment, the DEP also does not interpret it as a demonstration of improved biological condition in delisting decision-making.

Temporal variability of WVSCI reference sites has also been evaluated. Multiple biological re-sampling events have been performed at reference stations. The unchanged watershed conditions and consistent WVSCI scores demonstrate acceptable variability and reproducibility of the WVSCI methodology. Conversely, WVSCI temporal variability cannot be effectively assessed in disturbed watersheds without specific knowledge of changing watershed activities that may impact biological condition. The DEP maintains that the WVSCI protocol for assessment of the 47CSR2-3.2.i criterion is scientifically sound and that the arguments presented by the commenter do not support its abandonment.

Certain comments proclaimed that the Division of Water and Waste Management is being disingenuous in its assessment of the biological integrity of state waters "in an apparent effort to inflate the list of impaired streams in West Virginia and needlessly target the mining industry."

The DEP does not agree with the above assertions. The current list reflects the DEP's responsibility under the Clean Water Act to objectively

assess use attainment in West Virginia waters. The biological assessment methodologies associated with the 2010 effort are essentially the same as those used in the preparation of 303(d) lists over the past ten years. In the very limited instances where the source of biological impairment was identified as "mining," source determinations were made through consideration of scientific information generated in TMDL development processes.

A commenter urged the DEP to seek a statutory change that would allow review of 303(d) listing decisions by the Environmental Quality Board and to develop, through rulemaking, reasonable standards for adding or removing water bodies from 303(d) lists. The commenter cited footnote 19 of the West Virginia Supreme Court of Appeals decision Monongahela Power v. Chief, Office of Water Resources, 567 S.E.2d 629, 641 (W.Va. 2002).

In the cited decision, the Supreme Court ruled that a 303(d) list developed by the DEP did not constitute an "order" pursuant to W.Va. Code § 29A-1-2(e) and is not an action that is appealable to the Environmental Quality Board under W.Va. Code § 22-11-21 (1994). The Court found that the DEP-prepared list is essentially a recommendation and has no force and effect until approved by the Administrator of the EPA, which constitutes the final disposition of the matter. The Court also rejected an argument that persons affected by the list are denied due process, finding that they are provided with the requisite notice and right to be heard. The opinion referenced Federal Clean Water Act provisions mandating that States provide public notice and opportunity for public comment on 303(d) lists prior to final submission to the EPA and case law holding that the EPA's decisions concerning 303(d) lists and Total Maximum Daily Loads are reviewable in United States district courts.

In Footnote 19, the Court noted that there is nothing in federal law which prevents authorizing the Environmental Quality Board to review DEP-prepared 303(d) lists prior to their submission to the EPA for approval and respectfully invited the attention of the Legislature to the matter. While the commenter may seek the Legislature's attention, the DEP does not intend to independently do so. As evidenced by this responsiveness summary and those included in past 303(d) lists, the DEP professionally pursues list preparation and carefully considers and addresses public comments. In their approval, the EPA must determine that the DEP properly executed all of its responsibilities under Section 303(d) of the Act, including proper consideration and response to relevant public comments. State methodologies must be consistent with federal expectations for adding and removing water bodies from the list.

Because of the applicability of federal requirements, the draft nature of list preparation by the DEP and the availability of a federal forum for review of the approved final document, the promulgation of new State rules and/or the creation of an additional State administrative review process is not believed necessary.

Recognizing the extended period of time that may elapse between 303(d) listing and TMDL development, a commenter urged the DEP to consider the inequity of more stringent point source effluent limitations that may result from 303(d) listing even though the impairment might only be resolved by increased control of nonpoint sources.

NPDES permitting rules prohibit permit issuance that would cause or contribute to a violation of water quality standards. Identification of impairment, via 303(d) listing or other mechanisms, may necessitate point sources to achieve a water quality criterion without the benefit of a mixing zone. TMDL development may allow targeting of reductions from the primary causative sources. In some TMDLs developed by the DEP, pollutant reductions are prescribed only from nonpoint sources. In other instances both point and nonpoint source reductions are determined necessary to attain criteria. There will always be some lag time between listing and TMDL development. The commenter correctly recognized that the concern is beyond the purview of those developing the 303(d) list. Nonetheless, the concern is noted.

A commenter urged the agency to enhance its written program for stream listing by creating a transparent outline of its historical listing decisions and its current listing proposal. The commenter also urged enhancement of outreach activities to include opportunity for public

review and comment prior to finalizing the proposed list.

The DEP believes that the Section 303(d) listing process already accommodates the requests. Each list prepared by the DEP includes a detailed description of the current decision methodology and supplements that provide transparency for past listing decisions and the current classification of previously listed waters. An extended public notice and comment period is provided and comments are carefully considered and addressed.

General and stream-specific comments requested streams to be removed from the 303(d) list because of the age of the samples and data used for listing. The following streams were requested to be removed because of "old data": Maynard Branch (WVO-2-Q-23), Cutright Run (WVMTB-17), Sawmill Run (WVMTB-20), Short Creek (WVO-90), Jims Branch (WVO-2-Q-18-H) Copley Trace Branch (WVO-2-Q-18-G) Parker Branch (WVO-2-Q-18-D) Indian Creek (WVM-17) Buffalo Creek (WVPSB-5).

Some of the subject biological impairment listings had assessments performed by the DEP in calendar year 2000 and were first listed on the 2002 Section 303(d) list. The ages of the assessments are recognized, but the subject impairments were promptly listed on the next Section 303(d) list after assessment results became available. New data demonstrating non-impaired conditions is not available. The EPA closely evaluates the removal of waters from the 303(d) list without TMDL development. Excluding extenuating circumstances such as a criterion change or a determination that the original listing was made in error, delisting is approvable only where new information demonstrates attainment of water quality standards. TMDL development is preceded by a comprehensive water quality and biological monitoring effort. If new monitoring indicates that a stream is not impaired, then TMDL development will not be initiated and the new data will be used to support delisting of the impairment in the next Section 303(d) List.

Commenters have asked that Dents Run (WVM-23-P), Foxgrape Run (WVMT-26-B), Rockhouse Creek (WVKC-10-T-13), Copley Trace Branch (WVO-2-Q-18-G), Left Fork of Beech Creek (WVKC-10-T-15-A), and Rollem Fork (WVO-2-Q-18-E) be delisted for biological impairment. The requests are based on WVSCI scores for the most monitoring events that fall within the gray zone (60.6 - 68.0).

Streams are neither initially listed nor delisted when their score falls within this zone. Any listed stream which has newer data within the 60.6 to 68.0 range will be retained on the list as there is no evidence that the stream is fully attaining its aquatic life use (i.e. greater than 68.0).

A commenter suggested that the biological impairments of East Fork/Twelvepole Creek (WVO-2-Q) and Kiah Creek (WVO-2-Q-18) be delisted due to the results of recent monitoring believed by the commenter to demonstrate non-impairment.

Both streams were sampled, at numerous locations, in the spring of 2009 by both the DEP and consultants working on behalf of the commenter. The streams were then sampled again by the consultant in the fall of 2009 and again by the DEP in the summer of 2010. It was determined, using all the data available to the DEP, that the streams will not be delisted in their entirety but instead shall be re-segmented.

Reevaluation of East Fork/Twelvepole Creek biological data determined an error in the draft listing for the segment below the dam. No new data is available for this segment. Consistent with the 2008 Section 303(d) list, the impaired length of this segment has been changed to "RM 4.4 to RM 10.5 (East Lynn Dam)". Additionally, the agency confirmed the draft listing for the segment upstream of the lake (RM 35 to headwaters).

Based upon new information, the DEP adjusted the impaired length of Kiah Creek from "RM 3.9 to HW" to "RM 3.9 to RM 11.8". Current biological results indicate non-impaired conditions from RM 3.9 downstream and at the most upstream station (RM 11.8). Results between the aforementioned stations indicate impairment or uncertainty and do not support delisting of this segment.

A commenter provided biological data requesting the delisting of Wet Branch (WVK-61-C).

The DEP evaluated the data and found that it could not be used. The DEP has an accepted period of time in which biological samples are collected. In order for a sample to be considered comparable in must be sampled within the WVSCI index period of April 15th to October 15th. The WVSCI data submitted by the commenter was associated with a sample collected outside of the index period.

A commenter requested that Rollem Fork (WVO-2-Q-18-E), Parker Branch (WVO-2-Q-18-D), Honey Branch (WVO-2-Q-29), Jims Branch (WVO-2-Q-18-H), Copley Trace Branch (WVO-2-Q-18-G) and Maynard Branch (WVO-2-Q-23) be reevaluated as to length of listing and propriety of listing due to existing impoundments and beaver dams.

A field investigation of Rollem Fork in 2008 confirmed the presence of the first instream pond at approximate mile point 0.9. As such, the biological impairment indicated by the benthic macroinvertebrate collection near the mouth of Rollem Fork was considered to be representative of the stream segment between the mouth and mile point 0.9. The impaired reach of Rollem Fork was revised from 1.9 miles to 0.9 miles in the 2008 Section 303(d) list.

In response to the comment, the DEP re-measured Maynard Branch, Jims Branch and Parker Branch and determined impaired lengths indicated in the Draft 2010 303(d) List to be accurate. Copley Trace Branch was re-measured and the listing was revised from "entire length" to "mouth to river mile 1.5."

The presence of impoundments in a watershed and an implication that the observed biological impairments might be caused by the impoundment rather than by pollutants in the water is taken into consideration when listing a stream. The DEP recognizes that impairments that are not caused by a pollutant need not be included on the Section 303(d) list. In the Integrated Report format, such impairments can be placed in Category 4C rather than Category 5. Applicable the EPA guidance states that waters should be listed in relation to biological assessments unless the state can demonstrate that non-pollutant stressors cause the impairment or that no pollutant(s) causes or contributes to the impairment. While the DEP accepts that the upstream habitat alteration associated with impoundments might negatively impact downstream biological scores, seldom is there sufficient information to properly discern the causative stressors at the time of assessment and listing. Uncertainty of the causative source of biological impairment at the time of assessment, as is most often the case, is not a sufficient reason to exclude the impairment from the 303(d) list. Consistent with the EPA guidance, the DEP lists waters as biologically impaired if available monitoring results fall below the WVSCI threshold. Causative stressors are identified at the front end of the TMDL development process. If the stressor identification process determines that a pollutant does not cause the impairment, then a TMDL will not be developed.

One commenter requested delisting of Frances Creek (WVO-2-Q-18-F), contending the most recent data indicates a non-impaired condition.

The most recent data available (July 2010, WVSCI score = 58.4) indicates Frances Creek is biologically impaired.

One commenter suggested the source for Jims Branch (WVO-2-Q-18-H) biological listing is habitat based not related to upstream mining activities.

The DEP recognizes that there are multiple possible sources of biological impairment and identifies sources as unknown for most initial listings. The source for Jims Branch is currently listed as "unknown" and will be evaluated when the TMDL for this watershed is developed.

A commenter asked the DEP that Wiley Branch (WVO-2-Q-28) be removed from the 2010 Draft 303(d) list for biological impairment based on biological data from Fall 2009 submitted by the commenter.

The impairment was not previously listed and the most current qualifying

biological data (July 2010, WVSCI score = 64.7) falls within the gray zone and does not support a new listing. As such, the proposed listing has been removed.

A commenter requested delisting of biological impairments for Honey Branch (WVO-2-Q-29) and Right Fork/Cub Branch (WVO-2-Q-31-A) based on new data from samples collected in October 2009 and April 2010.

The DEP re-sampled Honey Branch and Right Fork/Cub Branch in July 2010 and resultant WVSCI scores (55.9 and 53.0, respectively) do not support delisting.

A commenter requested delisting of biological impairments for Indian Creek (WVM-17), Dents Run (WVM-23-P) and Sawmill Run (WVMTB-20) citing issues of representativeness of samples.

The DEP reviewed the sample information and determined the samples were comparable per the WVSCI methodology. The listings have been retained.

A commenter asked that Vance Branch (WVO-2-Q-18-C-1) be removed from the Draft list as the entire length of stream had received a Section 404 permit for its filling.

The DEP verified the existence of a permit to fill the stream and determined filling of the stream had taken place. The remaining section of stream does not contain suitable sample area to support the WVSCI protocol, therefore the small remaining portion of Vance Branch has been removed.

One commenter requested that the iron impairment of Indian Creek (WVM-17) be delisted.

The DEP has reviewed Division of Mining and Reclamation trend data for iron in Indian Creek and found one violation out of 51 samples in the past three plus years (2% rate of exceedance). Based on this data, the iron impairment was removed.

A comment was received requesting delisting of the biological impairment for Short Creek (WVO-90), stating the age of data used for listing and the number of samples were insufficient. The commenter also mentioned a more recent biological result (WVSCI score = 60.4 at mile point 3.4). Additionally, the commenter wanted the source of the Short Creek impairment changed from "mining" to "undetermined."

The WVSCI scores observed in 2005 clearly indicate biological impairment from the mouth through mile point 7.6. At that location, the observed WVSCI score of 61.3 falls within the 'gray zone.' As described previously, gray zone scores represent uncertain biological conditions and are not evidence of an acceptable condition. As per the listing methodology, the entire length of the stream will remain listed. The recent biological score of 60.4 does not contradict the assessment.

The 2005 monitoring of Short Creek and its tributaries was a component of pre-TMDL monitoring for the Upper Ohio South Watershed TMDL development project. Within that project, the biological stressor identification process determined ionic stress as a significant stressor of Short Creek. TMDL development for the biological impairment was deferred. Since a TMDL has not been developed for the biological impairment of Short Creek, it must remain on the 303(d) list. The EPA has directed the DEP to consider the results of stressor identification in identifying sources associated with 303(d) listings. In this instance, the sources of ionic stress are active and/or historical mining activities.

A commenter questioned the iron impairment for Paint Creek (WVK-65) based upon trout water criteria.

After consultation with the DNR, the DEP has determined Paint Creek to be a trout water for the section between Burnwell (RM 13.24) and Pax (RM 31.48). This is consistent with the segment identified as trout water in the 2001 Paint Creek TMDL. In the 2010 Draft 303(d) List, the DEP mistakenly identified the section above Pax as trout water and has corrected the listing.

Several commenters submitted data and/or WVSCI scores requesting reevaluation of the biological impairment listings of Pine Creek (WVOG-65-H), Right Fork of Pine Creek (WVOG-65-H-1), Cow Creek (WVOG-65-J), Rockhouse Creek (WVKC-10-T-13), and Left Fork of Beech Creek (WVKC-10-T-15-A).

The DEP requires basic information (i.e. location, methods, etc) be supplied with data in order for it to be qualified and evaluated. These submissions did not contain the necessary information; therefore, the DEP did not accept the data for evaluation.

A commenter requested changing the biological impairment listing for Spruce Fork (WVKC-10-T) from "entire length" to "mouth to river mile 13." The commenter provided a WVSCI score of 67.1 at river mile 13.

A WVSCI score that falls within the gray zone (60.6 to 68.0) does not indicate a non-impaired condition. Also, the submitted data did not meet the necessary qualifications. As such, Spruce Fork will remain on the 303(d) list for its entire length.

List Format Description

The format of the 2010 Section 303(d) list is organized around the Watershed Management Framework. The five hydrologic groups (A-E) of the framework provide the skeleton. Within each hydrologic group, watersheds are arranged alphabetically and impaired waters are sorted by stream code in their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criterion, the affected designated use, the general cause of the impairment (where known), the impaired length (or, by default, the entire length), the planned or last possible timing of TMDL development and whether or not the impairment was on the 2008 list. The cause of impairment is often unknown or uncertain at the time of listing and is so indicated on the list. The scheduling of TMDL development is discussed in detail in the Total Maximum Daily Load Process section. A West Virginia Watershed Management Framework map on page 6 is provided to assist navigation within the list. A key is also provided to aid in the interpretation of presented information.

List Supplements Overview

Seven supplements are provided that contain additional information. The seven supplements are entitled: "Previously Listed Waters – No TMDL Developed," "Previously Listed Waters – TMDL Developed," "Impaired Waters under TMDL Development," "Water Quality Improvements Being Implemented – Below Listing Criteria," "Impaired Waters – No TMDL Needed," "Total Aluminum TMDLs Developed," "Supplemental Table E - Manganese TMDLs" and "New Listings for 2010."

Supplemental Table A - Previously Listed Waters – No TMDL Developed

Previously listed waters from the 2008 list that are not on the 2010 list are included in this supplement if a TMDL has not been developed, and these waters have been reevaluated and determined not to be impaired. Causes for revision of the impairment status include recent water quality data demonstrating an improved water quality condition, revision to the water quality criteria associated with the previous listing, documentation that the water was previously listed in error or a modification of the listing methodology.

Supplemental Table B - Previously Listed Waters - TMDL Developed

TMDLs have been developed for many previously listed waters. TMDL development allows the removal of an impaired water from the 303(d) list. In the suggested format of the Integrated Report, such waters are to be classified in Category 4A and clearly distinguished from Category 5 and the 303(d) list. Waters included in Category 4A have TMDLs developed, but water quality improvements are not yet complete and/or documented. The waters identified in Supplement B will match those of Category 4A of the Integrated Report.

Supplemental Table C - Water Quality Improvements

The goal of TMDLs and stream restoration projects is to bring the stream back to the point where it meets its designated uses and the associated water quality criteria. Supplement C includes a listing of streams with improved water quality due to TMDL implementation or pre-TMDL stream restoration work resulting in delisting. In the Integrated Report, the waters in Supplement C are to be included in Category 1 (meeting all uses), provided that impairments for other uses/pollutants are not evidenced.

Supplemental Table D - Impaired Waters - No TMDL Development Needed

This table lists impaired waters for which either other control mechanisms are in place to control pollutants or the water is not impaired by a pollutant (i.e., flow alterations caused by mining). These are the same waters contained in the Integrated Report's Category 4b and 4c, respectively.

Supplemental Table E - Total Aluminum TMDLs Developed

This table contains a list of previously listed waters for total aluminum TMDL that were developed and established by the EPA. Due to a criteria change from total aluminum to dissolved aluminum, the state placed total aluminum TMDLs onto a separate table from Supplemental Table B.

Supplemental Table E - Manganese TMDLs Developed

Manganese TMDLs identify waters which had TMDLs developed based upon water quality criteria that is no longer effective. After the subject TMDLs were developed, EPA approved revisions to West Virginia water quality standards that restricted the applicability of the manganese criterion to five mile zones upstream of known water supply intakes. The table is included to document the development of the obsolete TMDLs and to distinguish them from the effective TMDLs identified in Supplemental Table B.

Supplemental Table F - New Listings for 2010

This table is a list of impaired waters that were not previously included on the 2008 Section 303(d) list.

2010 West Virginia Integrated Water Quality Monitoring and Assessment Report

west virginia department of environmental protection
Division of Water and Waste Management

WEST VIRGINIA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2010

Prepared to fulfill the requirements of Sections 303(d) and 305(b) of the federal Clean Water Act and Chapter 22, Article 11, Section 28 of the West Virginia Water Pollution Control Act for the period of July 2007 through June 2009.

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Introduction

The federal Clean Water Act contains several sections requiring reporting on the quality of a state's waters. Section 305(b) requires a comprehensive biennial report and Section 303(d) requires, from time to time, a list of waters for which effluent limitations or other controls are not sufficient to meet water quality standards (impaired waters). West Virginia code Chapter 22, Article 11, Section 28 also requires a biennial report of the quality of the state's waters.

This document is intended to fulfill West Virginia's requirements for listing impaired waters under Section 303(d) of the Clean Water Act and the Water Quality Planning and Management Regulations, 40CFR130.7. In addition to the list of impaired waters, it explains the data evaluated in the preparation of the list and methodology used to identify impaired waterbodies. Information is provided that allows the tracking of previously listed waters that are not contained on the 2010 list. The EPA has recommended these requirements be accomplished in a single report that combines the comprehensive Section 305(b) report on water quality and the Section 303(d) list of waters that are not meeting water quality standards. The suggested format of this "Integrated Report" includes provisions for states to place their waters in one of the five categories described in Table 1.

Table 1 - Integrated Report categories

Category 1	fully supporting all designated uses	
Category 2	fully supporting some designated uses, but no or insufficient information exists to assess the other designated uses	
Category 3	insufficient or no information exists to determine if any of the uses are being met	
Category 4	waters that are impaired or threatened but do not need a Total Maximum Daily Load	
	Category 4a	waters that already have an approved TMDL but are still not meeting standards
	Category 4b	waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses
	Category 4c	waters that have been determined to be impaired, but not by a pollutant
Category 5	waters that have been assessed as impaired and are expected to need a TMDL	

This Integrated Report is a combination of the 2010 Section 303(d) List and the 2010 Section 305(b) report. In general, this report includes data collected and analyzed between July 1, 2004 and June 30, 2009, from the state's 32 major watersheds by the West Virginia Department of Environmental Protection's (DEP's) Watershed Assessment Branch and other federal, state, private and nonprofit organizations. Waters that are included on the 2010 Section 303(d) List are placed in Category 5 of this report.

Water Quality Standards

Water quality standards are the backbone of the 303(d) and 305(b) processes of the federal Clean Water Act. Instream data are compared with water quality standards to determine the use attainment status of streams and lakes. In West Virginia, the water quality standards are codified as 47CSR2 – Legislative Rules of the Department of Environmental Protection – Requirements Governing Water Quality Standards. Impairment assessments conducted for the 2010 cycle are based upon water quality standards that have received the EPA's approval and are currently considered effective for Clean Water Act purposes. In that regard, the EPA has recently approved several changes to the West Virginia Water Quality Standards. Information regarding the approved changes can be found on the DEP's Web page at http://www.dep.wv.gov/WWE/Programs/wqs/Documents/EPA%20Letters/2009_09_16_07_57_00.pdf

A waterbody is considered impaired if it violates water quality standards and does not meet its designated uses. Use attainment is determined by the comparison of the instream values of various water

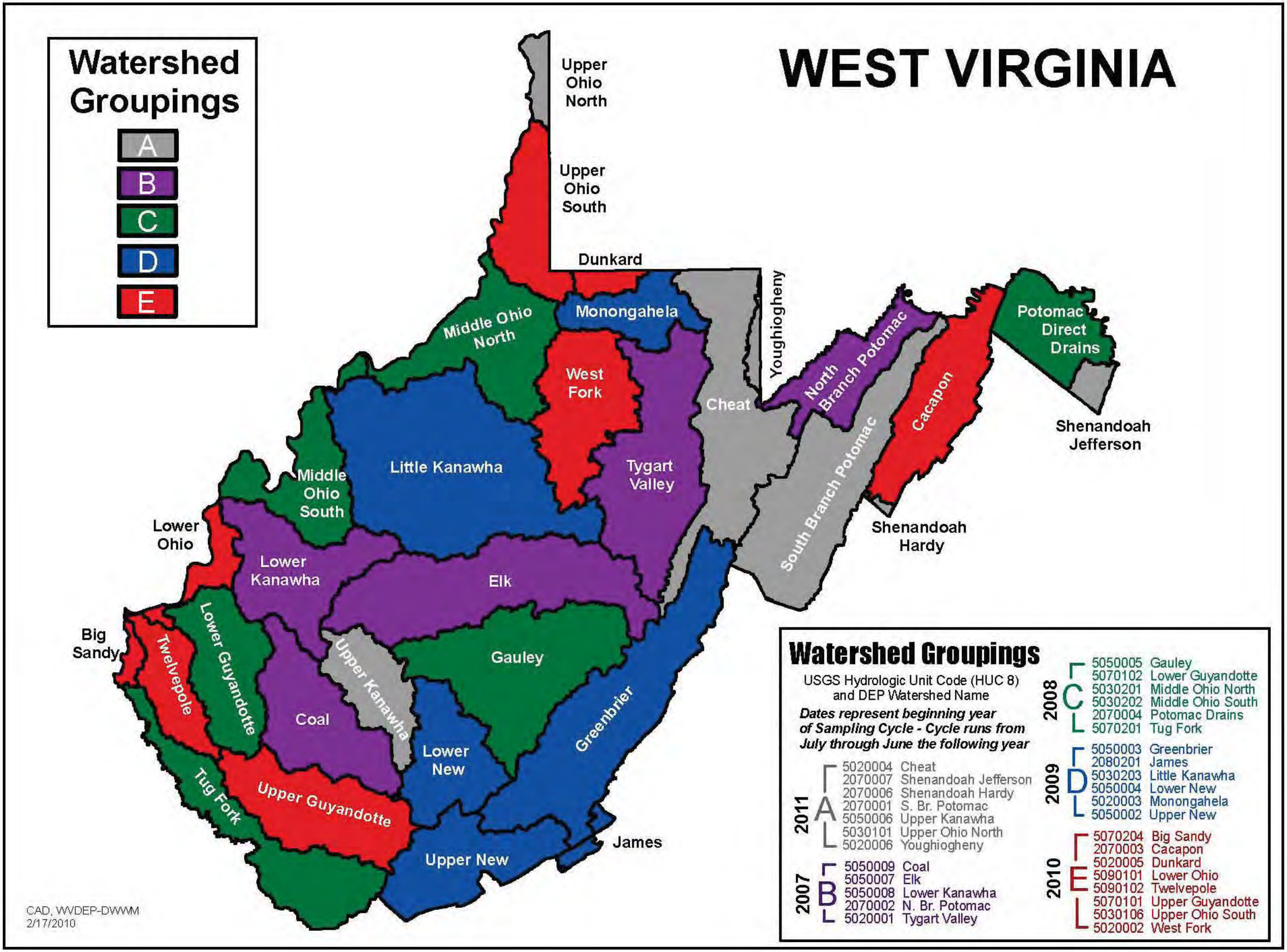
quality parameters to the numeric or narrative criteria specified for the designated use (see the Assessment Methodology section for more information on use attainment determination). Waterbodies that are impaired by a pollutant are placed on the 303(d) List and scheduled for TMDL development.

Some examples of designated uses are water contact recreation, propagation and maintenance of fish and other aquatic life, and public water supply. Designated uses are described in detail in Section 6.2 of 47CSR2 and are summarized in Table 2. Each of the designated uses has associated criteria that describe specific conditions that must be met to ensure that the water can support that use. For example, the "propagation and maintenance of fish and other aquatic life" use requires that the pH remain within the range of 6.0 to 9.0 standard units at all times. This is an example of a numeric criterion. Numeric criteria are provided in Appendix E of the water quality standards.

Numeric criteria consist of a concentration value, exposure duration and an allowable exceedance frequency. The water quality standards prescribe numeric criteria for the "propagation of fish and other aquatic life" use in two forms: acute criteria that are designed to prevent lethality, and chronic criteria that prevent retardation of growth and reproduction. The numeric criteria for acute aquatic life protection are specified as one-hour average concentrations that are not to be exceeded more than once in a three-year period. The criteria for chronic aquatic life protection are specified as four-day average concentrations that are not to be exceeded more than once in a three-year period. The exposure time criterion for human health protection is unspecified, but there are no allowable exceedances.

Table 2 - West Virginia designated uses

Category	Use Subcategory	Use Category	Description
A	Public Water	Human Health	waters, which, after conventional treatment, are used for human consumption
B1	Warm Water Fishery	Aquatic Life	propagation and maintenance of fish and other aquatic life in streams or stream segments that contain populations composed of all warm water aquatic life
B2	Trout Waters	Aquatic Life	propagation and maintenance of fish and other aquatic life in streams or stream segments that sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations
B4	Wetlands	Aquatic Life	propagation and maintenance of fish and other aquatic life in wetlands. Wetlands generally include swamps, marshes, bogs and similar areas
C	Water Contact Recreation	Human Health	swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats
D1	Irrigation	All Other	all stream segments used for irrigation
D2	Livestock Watering	All Other	all stream segments used for livestock watering
D3	Wildlife	All Other	all stream segments and wetlands used by wildlife
E1	Water Transport	All Other	all stream segments modified for water transport and having permanently maintained navigation aides
E2	Cooling Water	All Other	all stream segments having one or more users for industrial cooling
E3	Power Production	All Other	all stream segments extending from a point 500 feet upstream from the intake to a point one-half mile below the wastewater discharge point
E4	Industrial	All Other	all stream segments with one or more industrial users. It does not include water for cooling



WEST VIRGINIA
Watershed Groupings
A
B
C
D
E
Upper Ohio North
Upper Ohio South
Dunkard
Monongahela
Youghiogheny
Middle Ohio North
West Fork
Cheat
North Branch Potomac
Potomac Direct Drains
Cacapon
Shenandoah Jefferson
Little Kanawha
Tygart Valley
Middle Ohio South
South Branch Potomac
Shenandoah Hardy
Lower Ohio
Lower Kanawha
Elk
Big Sandy
Twelvepole
Lower Guyandotte
Upper Kanawha
Gauley
Coal
Greenbrier
Lower New
Tug Fork
Upper Guyandotte
James
Upper New
CAD, WVDEP-DWWM
2/17/2010
Watershed Groupings
USGS Hydrologic Unit Code (HUC 8) and DEP Watershed Name
Dates represent beginning year of Sampling Cycle - Cycle runs from July through June the following year
2011 A
5020004 Cheat
2070007 Shenandoah Jefferson
2070006 Shenandoah Hardy
2070001 S. Br. Potomac
5050006 Upper Kanawha
5030101 Upper Ohio North
5020006 Youghiogheny
2007 B
5050009 Coal
5050007 Elk
5050008 Lower Kanawha
2070002 N. Br. Potomac
5020001 Tygart Valley
2008 C
5050005 Gauley
5070102 Lower Guyandotte
5030201 Middle Ohio North
5030202 Middle Ohio South
2070004 Potomac Drains
5070201 Tug Fork
2009 D
5050003 Greenbrier
2080201 James
5030203 Little Kanawha
5050004 Lower New
5020003 Monongahela
5050002 Upper New
2010 E
5070204 Big Sandy
2070003 Cacapon
5020005 Dunkard
5090101 Lower Ohio
5090102 Twelvepole
5070101 Upper Guyandotte
5030106 Upper Ohio South
5020002 West Fork

Water quality criteria also can be written in a narrative form. For example, the water quality standards contain a provision that states that wastes, present in any waters of the state, shall not adversely alter the integrity of the waters or cause significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. Narrative criteria are contained in Section 3 of 47CSR2. More information regarding the use of narrative criteria is contained in the Use Assessment Procedures section.

Ohio River criteria

For the Ohio River, both the Ohio River Valley Water Sanitation Commission (ORSANCO) and West Virginia water quality criteria were considered, as agreed upon in the ORSANCO compact. Where both ORSANCO and West Virginia standards contain a criterion for a particular parameter, instream values were compared against the more stringent criterion. The DEP supports ORSANCO's efforts to promote consistent decisions by the various jurisdictions with authority to develop 305(b) reports and 303(d) lists for the Ohio River. In support of those efforts, West Virginia has and will continue to work with ORSANCO and the other member states through a workgroup charged with improving consistency of 305(b) reporting among compact states. ORSANCO standards may be reviewed at http://www.orsanco.org/index.php/standards.

Surface Water Monitoring and Assessment

This section describes West Virginia's strategy to monitor and assess the surface waters of the state. The DEP's Division of Water and Waste Management (DWWM) collects most of the state's water quality data. The Watershed Assessment Branch of DWWM is responsible for general water quality monitoring and watershed assessment. The remainder of this section describes the monitoring and assessment activities conducted by the Watershed Assessment Branch.

Streams and Rivers

West Virginia has a comprehensive strategy for monitoring the flowing waters of the state, by far the most prevalent surface waterbody type in the state. The Watershed Assessment Branch utilizes a tiered approach, collecting data from long-term monitoring stations, targeted sites within watersheds on a rotating basin schedule, randomly selected sites, and sites chosen to further define impaired stream segments in support of TMDL development. The following paragraphs present these approaches in further detail.

Probabilistic (random) sampling

Probabilistic sampling began in 1997. This program utilizes sites that are selected randomly by the EPA's Western Ecology Division Laboratory in Corvallis, Ore. The data collected at these sites can be subjected to statistical analysis to provide an overall characterization of a watershed. This analysis can then be used to predict the probability of a condition occurring within a watershed. The initial probabilistic sampling cycle, which concluded in 2001, was conducted in accordance with the five-year Watershed Management Framework cycle. Thirty sites were sampled within each watershed. A second round of probabilistic sampling, initiated in 2002, modified the framework cycle to a statewide approach. The objective for the second round was to collect 30 samples from each watershed over a five-year period (six sites are collected from each watershed annually). Importantly, at the end of the five-year cycle, each of the state's major watersheds will continue to be independently characterizable. The data analyzed for this report covers sampling years 2005 through 2009 and provides an overview of major pollutants impacting state waters.

This departure from the framework cycle minimizes the effects of extreme conditions, such as periodic droughts and flooding and allows for annual updates of statewide stream conditions. Data collection protocols are similar to those applied to watershed assessment sampling including collection of benthic macroinvertebrate for biological community analysis. However, probabilistic sampling includes more rigorous water quality and habitat analysis.

Ambient water quality monitoring network

The ambient water quality monitoring network concept was established

in the early 1960s. The network currently consists of 26 fixed stations that, starting in 2006, are sampled bi-monthly. Sampling stations are located at the mouths of the state's larger rivers and additional sites are situated to isolate the impacts from major industrial complexes and other potential sources of impairment. The data provides information for trend analyses, general water quality assessments and pollutant loading calculations, and allows water resources managers to quickly gauge the health of the state's major waterways.

Targeted sampling

Targeted sampling has been a component of West Virginia's assessment toolbox since the Watershed Assessment Program's inception in late 1995. Streams are sampled according to a five-year rotating basin approach. Sites are selected from the watersheds targeted for each particular year. Each site is subjected to a one-time evaluation of riparian and instream habitat, basic water quality parameters, and benthic macroinvertebrate communities.

Sites are selected to meet a variety of informational needs in the following areas:

- Impaired streams
- Reference (minimally impacted) streams
- Spatial trends (multiple sites on streams exceeding 15 miles in length)
- Areas of concern as identified by the public and stakeholders
- Previously unassessed streams

Pre-TMDL development sampling

The major objective of this effort is to collect sufficient data for Total Maximum Daily Load modelers to develop stream restoration plans. Pre-TMDL sampling follows the framework cycle, i.e., impaired streams from watersheds in hydrologic group A will be sampled in the same year as the targeted sampling.

The 303(d) List is the basis for initial site selection and additional sites are added to comprehensively assess tributary waters and to allow identification of the suspected sources of impairment. Benthic

Figure 1 – West Virginia's ambient monitoring sites

1. Shenandoah River at Harpers Ferry	14. Kanawha River at Winfield
2. Opequon Creek east of Bedington	15. Guyandotte River at Huntington
3. Cacapon River near Great Cacapon	16. Twelvepole Creek south of Ceredo
4. South Branch of the Potomac River	17. Tug Fork at Fort Gay
5. Cheat River at Albright, W.Va.	18. Guyandotte River at Pecks Mill
6. Cheat River below Cheat Lake	19. Coal River at Tornado
7. Monongahela River in Star City	20. Elk River at Coonskin Park
8. Dundard Creek east of Pentress	21. Kanawha River at Chelyan
9. Tygart Valley River at Colfax	22. Gauley River at Beech Glen
10. West Fork River at Enterprise	23. New River above Gauley Bridge
11. Middle Island Creek at Arvilla	24. Greenbrier River at Hinton
12. Hughes River west of Freeport	25. New River at Hinton
13. Little Kanawha River at Elizabeth	26. New River at Virginia state line

macroinvertebrate sampling is conducted in 303(d) listed streams having aquatic life impairments. Assessment of water quality impaired streams is more intensive and consists of monthly sampling for parameters of concern. This method captures data under a variety of weather conditions and flow regimes. Pre-TMDL sampling also includes an effort to locate the specific sources of impairment, with particular attention to identifying non-point source land use stressors as well as any permitted facilities that may not be meeting their permit requirements. For more information, see the TMDL Development Process section.

Lakes and Reservoirs

West Virginia does not make a distinction between lakes and reservoirs. By state definition, a publicly owned lake is any lake, reservoir, or pond that meets the definition of "waters of the state," is owned by a government agency or public utility, and is managed as a recreational resource for the general public. The DEP conducted lake water quality assessments from 1989 through 1996. This program was funded by the federal Clean Lakes Program, which was phased out in 1995. With additional financial support being provided to enhance state's monitoring strategies, DEP added a lake monitoring component in 2006. This program focuses on water quality, collecting field parameters (dissolved oxygen, pH, temperature, and conductivity), nutrient data, clarity, and Chlorophyll A. Multiple sites per lake are sampled and profile data for temperature and dissolved oxygen are obtained.

Many of West Virginia's largest reservoirs are controlled by the U.S. Army Corps of Engineers. Although the Corps' primary mission is to manage structures to provide navigation and flood control, the agency also is committed to water quality management. Data generated by the Corps has been used for assessment purposes.

Additional lake information is available from the West Virginia Division of Natural Resources. The DNR, one of the signatory agencies in the Partnership for Statewide Watershed Management, conducts fish community surveys on many of the state's reservoirs.

Biological Indicators

Benthic macroinvertebrates are collected from riffle substrate in wadeable streams and identified to genus level. This assemblage of aquatic life organisms provides a direct means of assessing the aquatic life use support and can be collected and identified cost effectively. It has the advantage over one-time water quality samples in that the benthic community is affected by and provides indications of past water quality conditions. The DEP currently uses the West Virginia Stream Condition Index, a family-level multimetric index developed specifically for use in West Virginia. This is the primary means of assessing attainment of the aquatic life use.

Wetlands

The State of West Virginia takes great interest in the management of its wetlands both large and small. The current total wetland area within the state is 102,000 acres which comprises less than 1 percent of the State's total acreage {wetland acreage determined by National Wetlands Inventory: WV 1980-86}. As of this report, instituted management efforts are currently geared toward protection of wetlands by regulatory proceedings or acquisition. Permitting authority for activities impacting wetlands (Section 404) lies with the U. S. Army Corps of Engineers. West Virginia insures protection through an active Section 401 certification program.

Since the submission of the last 305(b) report; changes in the status of West Virginia's wetlands monitoring are being pursued. These changes are intended to be the start of a larger statewide monitoring and assessment program. Watershed Assessment personnel have been researching/developing assessment and monitoring strategies in conjunction with the EPA and other states. The Wildlife Resources Section of the Division of Natural Resources, in cooperation with West Virginia University, is also currently evaluating aerial photography from 2003 at a 1:4800 scale to supplement the data from the National Wetlands Inventory. Information from this project will provide improved detail and information, because the original 1986 NWI's imagery was at a 1:48,000 scale. The updated wetland polygons will show any creations, natural changes, human modifications, or loss since the 1986 NWI as well as proper Cowardin classification. A set completion date is not available, but currently six counties have been QA/QC'd by the DNR personnel and the DNR plans to finish most of the state during 2010.

The West Virginia Division of Natural Resources and the DEP plan to begin a wetlands monitoring and assessment program prior to the 2011 National Assessment. Due to the specialized skills of the the DNR, the responsibilities of a majority of field work will fall with the DNR. The DEP will combine efforts and personnel where applicable in the field as well as remain the primary reporting entity for the state. The DNR has recently completed a rapid assessment method for wetlands which can be used statewide. Calibration with intensive assessments and GIS remote assessments on the same wetlands/sites gives us high confidence in data to be generated in future rapid assessments. The DNR plans to start collecting data for database use/storage in the field season of 2010.

A National Wetlands Condition Assessment (EPA) is planned for 2011

Table 3 - Current and future monitoring activities
26 Ambient sites will be monitored monthly (Monongahela River Basin sites) or bi-monthly from July 2009 through June 2011
A third round of probabilistic monitoring that began in the spring of 2007 will continue through 2011. Seventy-eight site are assessed each year. Fish Community assessements are being conducted at approximately one-third of the sites.
Pre-TMDL development monitoring for Group D - 181 sites from 118 streams in the Monongahela River Watershed were sampled from July 2009 through June 2010.
Pre-TMDL development monitoring for Group E - 301 sites from 224 streams in the West Fork River Watershed will be sampled from July 2010 through June 2011.
Group D Targeted Sampling – 53 targeted sites were sampled in 2009. Targeted assessments include water quality, biology, and habitat measures.
Group E Targeted Sampling – Approximately 50 sites will be sampled during the 2010 summer sampling season.
Lakes – Eight lakes within Group E will be sampled four times during the 2010 growing season (May through October) and approximately 10 Group A Lakes will be sampled in 2011.
Water quality meters were deployed at 48 locations on 36 streams. Parameters measured include pH, temperature, conductivity, and dissolved oxygen.
Long Term Monitoring Sites (LTMS or LitMuS). Approximate 50 sites were sampled in 2009. A similar or greater number will be assessed in 2010.

which will encompass the entire United States. The DEP continues to maintain contact with the EPA in preparation for this NWCA; and the DEP and DNR plan to combine efforts to assess the sites in West Virginia. The EPA intends to inform states of site selections by March 2010 and follow with standardized assessment methods by April 2010.

Current wetland information can be found in the booklet West Virginia's Wetlands… Uncommon, Valuable Wildlands (Tiner, 1996). Future valuable information on the number and condition of West Virginia's wetlands will be available from the EPA, DEP, and DNR.

Citizen monitoring

The fourth stream assessment project is the West Virginia Save Our Streams volunteer monitoring program. Initiated in 1989, this program encourages citizens to become involved in the improvement and protection of the state's streams. The focus is largely on nonpoint source pollution abatement. Save Our Streams has two objectives. First, it provides the state with enhanced ability to monitor and protect its surface waters through increased water quality and benthos data collection. Second, it improves water quality through educational outreach to the state's citizens. After citizens are actively involved in stream monitoring and restoration activities, they can initiate improvement projects within their own watersheds. Training workshops are conducted annually to provide quality assurance. A major improvement in data accessibility for the program has been the development of an online Volunteer Assessment Database. As an example of the functions of the new database, volunteer stream reports are now available online at http://www.dep.wv.gov/WWE/getinvolved/SOS/Pages/WAD.aspx. Volunteer monitors can register on the database and enter their own data online, or continue to submit the information to the coordinator for a quality assurance review. The coordinator also is the database administrator, and has tools to verify the quality of the information before it is approved. The database is available for public viewing without registration. In addition, the program prepares an annual "State of Our Streams" report.

DATA MANAGEMENT

Assessed data

All readily available data was used during the evaluation process. In preparation for the development of this report, the agency sought water quality information from various state and federal agencies, college and universities, private individuals, businesses, organizations and others. News releases and public notices were published in state newspapers. Specific requests for data were made to state and federal agencies known by the DEP to be generators of water quality data. The DEP's staff reviewed data from external sources to ensure that collection and analytical methods, quality assurance and quality control and method detection levels were consistent with approved procedures. In addition, DEP has developed guidance for those wishing to submit data. The document contains a list of requirements for submitted data along with helpful internet links and a checklist for data submitters. The guide can be found on the DEP's Web site using the following link: http://www.dep.wv.gov/WWE/watershed/IR/Documents/WV_WQ_Data_Submission_Guidelines_2010.pdf

Assessment decisions are made using the most accurate and recent data available to the agency. For stream water quality assessments, the DEP generally used water quality data generated between July 2004 and June 2009. The use of data more than five years old is intentionally limited. In the absence of new information, previous assessments are carried forward even if the data becomes older than five years. Additionally, if a water quality criteria change is approved which affects an older assessment, the new assessment will only reflect the current criteria.

Waters are not deemed impaired based upon water quality data collected when stream flow conditions are less than 7Q10 flow (the seven consecutive day average low flow that recurs at a 10 year interval) or within regulatory mixing zones. Further, waters are not deemed impaired based upon "not-detected" analytical results from methodologies that have detection limits that are not sensitive enough to confirm criteria compliance.

External data providers

Data submitted from sources outside of the Watershed Assessment Branch were considered in the development of this report. This also includes data from other the DEP programs. Entities that provided information in response to the agency's request for data for the 2010 Section 303(d) list are shown in Table 4. External data received and qualified in the preparation of previous Section 303(d) lists were reconsidered in the 2010 review. Once data was submitted, the DEP performed the following:

- Determined quality and quantity
- Determined stream codes and mile points
- Formatted data for evaluation
- Used qualified data from external sources to make assessment decisions

Table 4 - Data providers for the 2010 303(d) List and Integrated Report

ARGUS Energy	Chesapeake Bay Program Office	West Virginia Department of Agriculture
Don Gasper	Friends of Deckers Creek	West Virginia Department of Environmental Protection
ORSANCO	State of Kentucky	The Conservation Fund Freshwater Institute
U.S. Army Corps of Engineers	USDA Forest Service	U.S. Geological Survey
West Virginia Water Research Institute	Mud River Watershed Decentralized Wastewater Demonstration Project	

USE ASSESSMENT PROCEDURES

The primary focus of this report is to assess water quality information and determine if the designated uses of state waters are impaired. This section describes the various protocols used to determine use impairment.

303(d) Listing Methodology

Numeric water quality criteria

The decision methodology for numeric water quality criteria used in preparation of the draft 2010 Section 303(d) list are consistent with those used in 2008 listing cycle.

Typically, if an ample data set exists and exceedances of chronic aquatic life protection and/or human health protection criteria occur more than 10 percent of the time, the water is considered to be impaired. If the rate of exceedance demonstrated is less than or equal to 10 percent, then the water is considered to be meeting the designated use under evaluation. Ample data sets are defined as sets with 20 or more distinct observations. If fewer than 20 samples per station or representative area exist and three or more values exceed a criterion value, then the water also is considered to be impaired. For this scenario (three observed violations), if additional non-exceeding monitoring results were available that would increase the data set size to 20 observations, a greater than 10 percent exceedance frequency would still exist.

Under West Virginia Water Quality Standards, acute aquatic life protection criteria have associated exposure durations of one hour and may be exceeded once every three years. The normal practice of "grab-sampling" ambient waters is generally consistent with the one-hour exposure duration specified in the standards. Therefore, a direct application of the allowable exceedance frequency provided in the standards is made when assessing impairment relative to acute aquatic life protection criteria. If two or more exceedances of acute criteria are observed in any three-year period, the water is considered to be impaired.

If the data being evaluated is generated as part of a comprehensive network being monitored for a specific purpose, the data may be assigned a higher level of assessment quality, and the "10-percent rule" may be applied with confidence to data sets containing less than 20 observations per station. The primary example of an intensified monitoring program that generates higher assessment quality data is that which is conducted by the DEP to support TMDL development. The pre-TMDL monitoring format includes flow measurement and monthly water quality monitoring for one year at multiple locations throughout a watershed. Information is generated over a range of stream flow conditions and in all seasons. Habitat assessment and biological monitoring is performed in conjunction with water quality monitoring. The information generated under this format is among the most comprehensive available for assessing water quality. Upon conclusion of monitoring, it is then necessary for agency personnel to make a definitive judgment relative to impairment. In most instances, application of the "10-percent rule" to the pre-TMDL monitoring data sets result in the classification of waters as impaired if two or more exceedances of a criterion are demonstrated.

Additionally, the DEP does not interpret the impacts of a single pollution event as representative of current conditions if it is believed that the problem has been addressed. Similarly, the DEP does not intend to interpret the results of clustered monitoring of a single event as being representative of water quality conditions for longer time periods. Datasets are screened for excessive clustering of monitoring, in space or time, to avoid misinterpretation.

Table 5 summarizes the criteria used to make 303(d) impairment decisions relative to numeric water quality criteria period.

Segmentation of streams

The majority of newly listed streams were identified as impaired for their entire length. Segmentation occurred only in limited situations involving streams with impoundments or alternative designated uses, or when knowledge of a specifc pollutant source allowed clear distinction of impaired and unimpaired segments.

Segmentation based upon the limited amount of water quality monitoring data that is usually available may not accurately portray the extent of

Table 5 - Numeric water quality decision criteria for listing of impaired waters		
Water Quality Criteria	**Impairment Thresholds**	**Additional Considerations**
Acute Aquatic Life Protection (Use Category B)	**The water is impaired if two exceedances of acute aquatic life protection numeric criteria occur within any three-year period.**	**If, in the most recent three-year period, no exceedances of criteria are evidenced and at least 12 monitoring results are available, then the water may not considered "impaired."**
Chronic Aquatic Life Protection (Use Category B) Human Health Protection (Use Categories A and C)	**The water is impaired if a greater than 10% frequency of exceedance is demonstrated in an ample dataset (20 or more available observations). The water is impaired if three exceedances of criteria occur with less than 20 available monitoring results. The water is impaired if a greater than 10% frequency of exceedance is demonstrated with less than 20 available observations, if the data being evaluated is of high assessment quality (> two violations)**	**If, for waters with regularly scheduled monitoring, in the most recent two-year period, no exceedances of criteria are evidenced and at least eight observations are available, then the water is not considered impaired.**

impairment and may contradict the ultimate findings of the TMDL that the listing mandates. The DEP believes the TMDL development process, which links extensive water quality monitoring with pollutant sources through computer modeling, provides the best assessment of criterion attainment and the most accurate identification of the watershed sources for which pollutant reductions are necessary. TMDL modeling predicts water quality over a wide range of climatic and stream flow conditions, incorporates the specific exposure duration and exceedance frequency terms of water quality criteria and prescribes pollutants allocations that will result in attainment of criteria in all stream segments.

Evaluation of fecal coliform numeric criteria

Fecal coliform assessments were based on the previously described decision criteria for numeric water quality criteria. Given the complexity of this particular criteria, most assessments are performed by comparing observations to the "maximum daily" criterion value of 400 counts/100ml. Evaluation of the monthly geometric mean fecal coliform criterion (200 counts/100ml) occurs only where five or more individual sample results are available within a calendar month.

Numeric fecal coliform water quality criteria are applicable to the Water Contact Recreation and Public Water Supply designated uses. Section 8.13 of Appendix E of the West Virginia Water Quality Standards states: *Maximum allowable level of fecal coliform content for Primary Contact Recreation shall not exceed 200/100ml as a monthly geometric mean based on not less than five samples per month; nor to exceed 400/100ml in more than 10 percent of all samples taken during the month.*

A practical difficulty exists in accurate assessment of criteria compliance due to the resource commitment that would be necessary to perform monitoring at a sufficient frequency to make determinations using the geometric mean criteria, since the monthly geometric mean criterion is conditioned upon the availability of at least five distinct sample results in a month. The "maximum daily" criterion is not conditioned by a minimum sample set requirement, but practical use of the apparent 10 percent exceedance allowance would involve at least 10 samples per month.

The most frequent and regular fecal coliform water quality monitoring conducted by the Watershed Assessment Section is once per month. That monitoring frequency precludes assessment of the monthly geometric mean criterion and hampers accurate assessment of the maximum

daily criterion. Due to limited resources, more frequent fecal coliform monitoring could only be accomplished by significantly reducing the number of West Virginia streams and/or stations where water quality assessments are performed. The DEP does not consider that to be a reasonable alternative.

The DEP uses the following protocols when making assessments relative to fecal coliform numeric criteria:

- *No assessments are based upon the monthly geometric mean criterion (200 counts/100ml) unless an available data set includes monitoring at five per month or greater frequency. When data sets are available, the listing decision criteria for numeric water quality criteria are applied, considering each monthly geometric mean as an available monitoring result.*
- *The listing decision criteria are applied to the maximum daily criterion (400 counts/100ml) and available individual monitoring results, but without the monthly prejudice. For example, if twice per month monitoring is conducted for a year and two results in two separate months are greater than 400, the stream would be assessed as fully supporting (2/24 – 8.3 percent rate of exceedance) rather than basing assessments on two monts out of 12 in noncompliance (2/12 – 16.7 percent rate of exceedance). If five samples per month monitoring is conducted for one year and four daily results greater than 400 are measured in four different months, the stream would be assessed as fully supporting (4/60 – 6.7 percent rate of exceedance) rather than nonsupporting (4/12 – 33.3 percent rate of exceedance), provided that the monthly geometric means were below the 200 counts/100 ml criteria.*

The decision criteria does not provide for 303(d) listing of waters with severely limited data sets and exceedance (i.e., one sample in a five-year period > 400 counts/100ml). Such waters would be classified as having insufficient data available for use assessment. The DEP will target these "fecal one-hit" waters for additional monitoring by incorporating them into the pre-TMDL monitoring plans at the next opportunity for TMDL development in their watershed. Where the intensified pre-TMDL monitoring (monthly sampling for one year) indicates impairment, TMDL development will be immediately initiated, even though the water may not be included in Category 5 of the current Integrated Report.

Narrative water quality criteria – biological impairment data

The narrative water quality criterion of 47CSR2 – 3.2.i. prohibits the presence of wastes in state waters that cause or contribute to significant adverse impact to the chemical, physical, hydrologic and biological components of aquatic ecosystems. Streams are listed as biologically impaired based on a survey of their benthic macroinvertebrate community. Benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams of West Virginia. The West Virginia Stream Condition Index (WVSCI) is composed of six metrics that were selected to maximize discrimination between streams with known impairments and reference streams. Streams with WVSCI scores of less than 60.6 are considered biologically impaired and included on the 303(d) List. Benthic macroinvertebrates are collected with a 500 mm mesh rectangular dip net. The kick sample is collected from the 1.0 m^2 area of substrate. Identifications are completed for a 200-organism subsample. The WVSCI was developed

West Virginia Stream Condition Index or WVSCI

The WVSCI consists of six benthic community metrics combined into a single multimetric index. The WVSCI was developed by Tetra Tech Inc. (2000) using DEP and EPA data collected from riffle habitats in wadeable streams.

In general terms, all metric values were converted to a standard 0 (worst) to 100 (best) point scale. The six standardized metric scores were then averaged for each benthic sample site to come up with a final index score ranging from 0.0 to 100.0. Using the distribution of scores from all sites that are considered reference sites, an impairment threshold of 68.0 was established. If a stream site received a WVSCI score greater than 68.0, it was considered to be unimpaired.

WVSCI Scoring Criteria
> 68.0 Unimpaired
≥ 60.6 to 68 "Gray Zone"
< 60.6 Impaired

To address the potential variability associated with a number of factors (collector, micro-habitat, subsampling, etc.) a precision estimate was determined by analysis of duplicate biomonitoring data. The precision estimate (7.4 WVSCI points) was subtracted from the impairment threshold to define a "gray zone" of WVSCI scores between 60.6 and 68.0 for which adverse impact to biological integrity is less than certain.

The effective use of limited TMDL development and implementation resources requires the avoidance of impairment misclassifications. Although the true WVSCI impairment threshold is 68.0, DEP identified biological impairment in the 303(d) listing process only in response to WVSCI scores less than 60.6, so as to allow the highest degree of confidence in the validity of the listed biological impairments.

from data using these methods. Streams are listed as being biologically impaired only if the data was comparable (e.g., collected utilizing the same methods used to develop the WVSCI, adequate flow in riffle/run habitat, and within the current index period).

Most streams with low biological scores are listed as having an unknown source/cause of impairment on the 303(d) List and most are listed, by default, for their entire length. It is doubtful that the entire length of every stream is impaired, but without further data, the exact length of impairment is unknown. Each listed stream will be revisited prior to TMDL development. The additional assessments performed in the pre-TMDL monitoring effort will better define the impaired length. The causative stressor(s) of the impairment and the contributing sources of pollution also will be identified during the TMDL development process. If the stressor identification process demonstrates that the biological impairment is not caused by a pollutant, then no TMDL will be developed.

Narrative water quality criteria – fish consumption advisories

The narrative water quality criterion of 47CSR2 – 3.2.e prohibits the presence of materials in concentrations that are harmful, hazardous or toxic to man, animal or aquatic life in state waters. Fish consumption advisories are used to inform the public about potential health risks associated with eating fish from West Virginia's streams. The DEP, the Division of Natural Resources, and the Bureau for Public Health have collaborated on fish contamination issues since the 1980s; however, an executive order by the governor in 2000 mandated a formal collaborative process to issue fish consumption advisories. Fish consumption advisories are developed and issued in accordance with an interagency agreement. In the absence of specific body-burden criteria, the presence of contaminants in fish tissue in amounts equivalent to a two meal per month advisory is considered sufficient evidence of impairment.

Risk-based principles are used to determine whether fish consumption advisories are necessary. These advisories are used as a public education tool to help citizens make informed decisions about eating fish caught in state streams. The risk-based approach estimates the probability of adverse health effects and provides a statement on the health risk facing the angler and high-risk groups including women of childbearing age and children. West Virginia's fish consumption advisories include guidelines on the number of meals to eat and information on proper fish preparation to further minimize risk.

Waterbody-specific fish consumption advisories exist for 16 state streams and six lakes for a variety of fish species and contaminants. Additionally, there is a general statewide advisory that recommends limiting the consumption of certain sport-caught fish from all West Virginia waters in relation to low-level mercury and/or polychlorinated biphenyl (PCB) contamination. The statewide advisory provides species-specific recommendations ranging from one meal per week to one meal per month. The fish advisories Web site is www.wvdhhr.org/fish/current.asp.

The listing of waters based on fish consumption advisories is strongly supported by the EPA. For PCBs, waters are considered impaired if at least one monitoring result for tissue from a commonly consumed species exceeds the two meal per month advisory trigger. In regard to mercury, West Virginia water quality standards contain a numeric body-burden criterion for methylmercury in fish tissue. The criterion for protection of public water supply and water contact recreation designated uses is 0.5 μg/g. In the Ohio River, the applicable ORSANCO body-burden criterion is 0.3 μg/g. Fish tissue mercury impairment decisions are based upon a direct comparison of available observations to the applicable body-burden criteria.

Narrative Water Quality criteria - Greenbrier River algae

In recent years, the DEP has received a number of reports of excessive algal growth along certain sections of the Greenbrier River which has made fishing and swimming in the areas nearly impossible during portions of the summer season. In order to address this loss of recreational use, the DEP began evaluating algal growth on the Greenbrier River in 2007 to determine both the extent of impact and the sources of pollution which were contributing to these conditions.

The initial investigation documented conditions in the mainstem of

the Greenbrier River. Thick algal mats and/or large areas of attached filamentous algae growth occurred over approximately 50 miles of the river, at times stretching from bank to bank. Similar conditions occurred in 2008. During both 2007 and 2008, public water suppliers drawing river water from affected areas received complaints of odor in their drinking water requiring initiation of additional treatment measures.

In 2009, DEP personnel performed intensive water quality sampling along the Greenbrier River as the algae began to bloom. Instream grab samples were analyzed for total and dissolved phosphorus, total nitrogen, alkalinity, hardness, and other parameters. Both the chemical and physical conditions in the Greenbrier River – including hardness, alkalinity, temperature, clarity, and substrate – proved to be ideal for growth of filamentous algae. The water chemistry results also revealed elevated levels of nitrogen and dissolved phosphorus in areas of excessive algae growth, with phosphorus being the limiting nutrient. The written report *Assessment of Filamentous Algae in the Greenbrier River and Other West Virginia Streams* summarizing the investigation is available on the DEP's Web site, www.dep.wv.gov/WWE/watershed/wqmonitoring/documents/Greenbrier/Algae_Summary_WQS_meeting_May_09.pdf.

Currently West Virginia does not have numeric water quality criteria for phosphorus in flowing rivers. However, seasonal non-attainment of designated uses (public water supply and contact recreation) has been documented due to excessive algal growth and the excessive algae growth has been attributed to anthropogenic phosphorous inputs. Non-attainment of uses is based on multiple provisions of Title 47-2-3.2 of the West Virginia Legislative Rules ("Conditions Not Allowable in State Waters"). Section 3.2.a prohibits distinctly visible floating and suspended solids (filamentous algae mats) which pervade large reaches of the Greenbrier River. Section 3.2.h prohibits conditions that require treatment beyond conventional treatment to produce finished drinking water and Section 3.2.i prohibits conditions caused by wastes that adversely alter the integrity of a stream, including impacts to the physical, chemical and biological components of an aquatic ecosystem. In the case of the Greenbrier River, the DEP has determined the existence of the prohibited conditions and causation by a pollutant. The DEP is assessing the Greenbrier River as impaired from its mouth upstream to mile point 102.7.

ASSESSMENT RESULTS

This section contains the results from all the data that has been assessed for West Virginia waterbodies. Table 6 shows a summary of the classification of West Virginia waters under the five "Integrated Report" categories (see page 4). The results reveal that 23 percent of West Virginia's stream miles are in either Category 1 or 2 (fully supporting all or some assessed uses). Category 3, streams with insufficient data, makes up 39% of stream miles, the largest percentage of the five categories. However, that number is somewhat deceiving. The streams with limited data are typically small unnamed tributaries, which usually contribute to the larger waterbodies which have been assessed. All major rivers in the state; the Kanawha, Monongahela and Little Kanawha rivers, have data and have been assessed and placed into one of the other four categories. Approximately one-third of West Virginia's streams are impaired and fall into either Category 4 or 5.

Category 1, Category 2, and Category 3 waters are quite large, therefore, they are not published in this document. The three categories can be viewed on DEP's Web site, www.dep.wv.gov. Waters listed in category 4 are included in the supplements toward the back of this document in Supplemental B, B1, and D sections. Category 5 waters are included in the document and is the 303(d) List.

Category 5 includes 1091 impaired stream segments, covering approximately 6,685 stream miles that are impaired and need TMDLs developed. This number has increased from 6,157 miles of impaired streams identified on the 2008 list. The increase is due, in part, to the TMDL development timeline. TMDLs always are in various stages of development, and with the additional sampling data generated, streams and stream segments may move from Catergories 1, 2 or 3 to Category 5.

Table 6 - 2010 Category Summary Report for West Virginia					
LAKES					
Type	**CATEGORY**	**# of lakes**	**% lakes**	**acres**	**% acres**
Lake	**1**	**27**	**20**	**522**	**2**
Lake	**2**	**47**	**36**	**5990**	**26**
Lake	**3**	**43**	**32**	**10029**	**43**
Lake	**4a**	**9**	**7**	**189**	**1**
Lake	**5**	**6**	**4**	**6498**	**28**
	TOTAL	**132**	**100**	**23228**	**100**
STREAMS					
Type	**CATEGORY**	**# of stream segments**	**% stream segments**	**miles of streams**	**% miles**
Stream	**1**	**1269**	**11**	**4378**	**14**
Stream	**2**	**824**	**7**	**2834**	**9**
Stream	**3**	**6776**	**61**	**11711**	**39**
Stream	**4a**	**1180**	**11**	**4883**	**16**
Stream	**4b**	**2**	**0**	**2**	**0**
Stream	**4c**	**36**	**0**	**35**	**0**
Stream	**5**	**1091**	**10**	**6685**	**22**
	TOTAL	**11178**	**100**	**30528**	**100**

Additionally, TMDLs that have not yet been approved by the EPA remain listed in Category 5. Once these TMDLs are approved, those streams and stream segments will move to Category 4a.

Table 7 contains a breakdown of use support specific to the use categories for state waters as set forth in the Water Quality Standards (47CSR2). The most common impairments of West Virginia waters are:

- Biological impairment, as determined through application of the West Virginia Stream Condition Index
- Bacterial contamination evidenced by exceedance of numeric water quality criteria for fecal coliform
- Exceedance of numeric water quality criteria for pollutants associated with mine drainage (low pH, and high concentration of iron, aluminum, and/or manganese)
- PCB fish tissue contamination, and
- Low pH associated with acid rain

The list and the summary results of Tables 8 and 9 provide an overview of the impairment status of West Virginia waters. An alternative mechanism for assessing general status and the relative impacts of various causes and sources is provided by DEP's Probabilistic Monitoring Program. The program and assessment results are described in the Probabilistic Data Summary section.

Table 7 - West Virginia use support summary

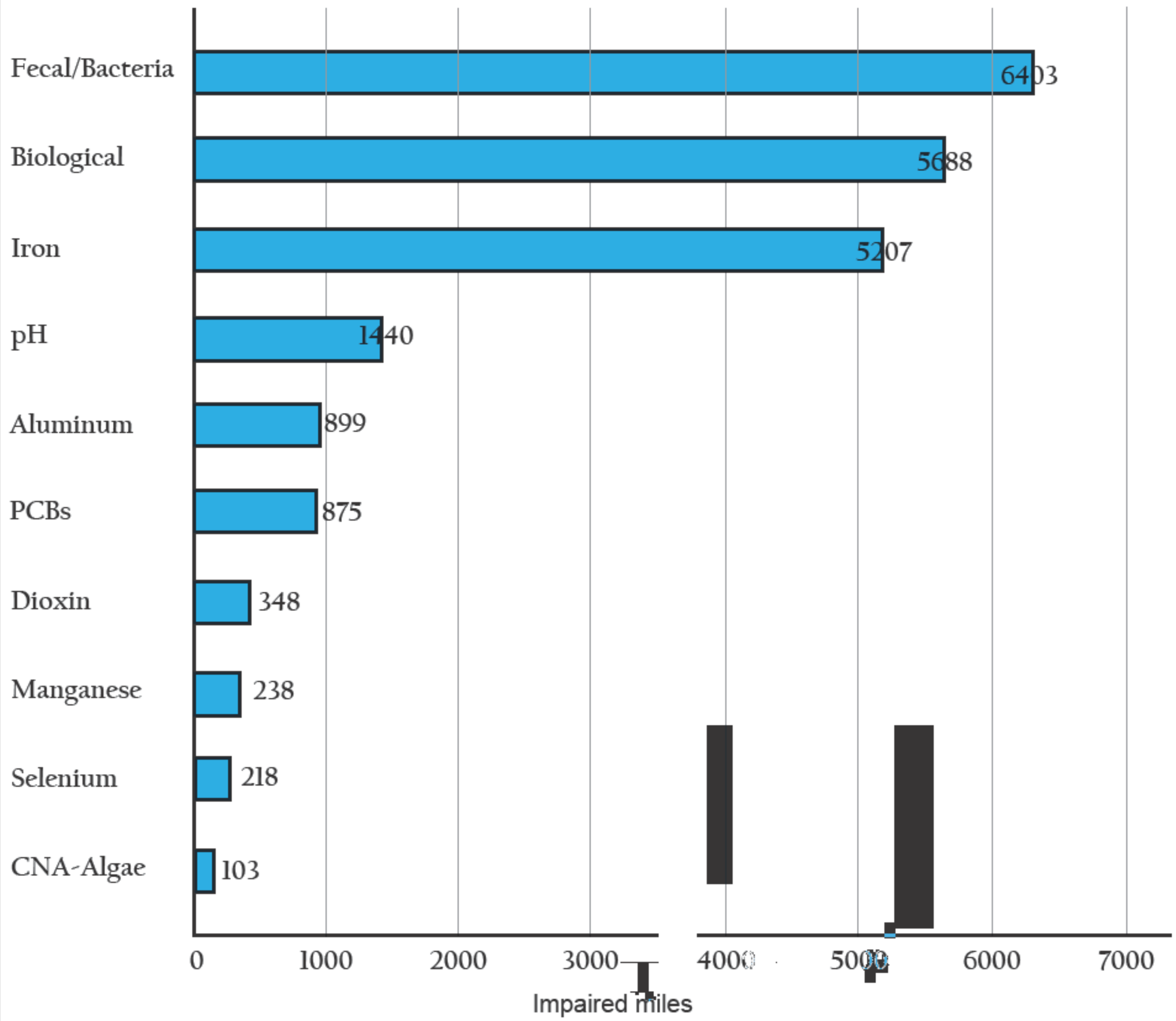
LAKES																		
Designated Use	Number of Lakes	Size (acres)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Acres	%	#	%	Acres	%	#	%	Acres	%	#	%	Acres	%
A - Public Water	132	23228	33	25	852	4	55	42	20772	89	35	26	1415	6	9	7	189	1
B1 - Warm Water Fishery	113	17891	25	22	550	3	44	39	15737	88	35	31	1415	8	9	8	189	1
B2 - Troutwater	19	5337	12	63	999	19	7	37	4338	81	0	29	0	0	0	0	0	0
C - Contact Recreation	132	23228	62	47	3395	15	25	19	11863	51	38	29	1468	6	7	5	6502	28
D - Agriculture and Wildlife	132	23228	70	53	6243	27	23	17	15513	67	38	29	1468	6	1	1	4	0
E -Industrial	132	23228	70	53	6243	27	23	17	15513	67	38	29	1468	6	1	1	4	0
Total	132	23228																

STREAMS																		
Designated Use	Number of Stream Segments	Size (miles)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Miles	%	#	%	Miles	%	#	%	Miles	%	#	%	Miles	%
A - Public Water	11175	30525	2319	21	9120	30	437	4	1060	3	6603	59	11269	37	1816	16	9076	30
B1 - Warm Water Fishery	10146	25473	1166	12	3935	15	992	10	3207	13	6323	62	10637	42	1665	16	7694	30
B2 - Troutwater	1032	5051	347	34	1979	39	228	22	1292	26	278	27	628	12	179	17	1152	23
C - Contact Recreation	11178	30528	2368	21	8616	28	720	7	2641	9	6622	59	11303	37	1468	13	7968	26
D - Agriculture and Wildlife	11177	30527	3694	33	15896	52	343	3	1471	5	6622	59	11303	37	518	5	1858	6
E -Industrial	11178	30528	3694	33	15896	52	343	3	1471	5	6622	59	11303	37	519	5	1858	6
Total	11178	30528																

Table 8 - Summary of the causes for impaired streams

TYPE	CAUSE	SIZE (acres)
Lake	Sedimentation/ Siltation	193
Lake	Trophic State Index	100
Lake	Iron	54
Lake	DO	8
Lake	PCBs	6498
TYPE	CAUSE	SIZE (miles)
Stream	Temperature, water	2.3
Stream	Ammonia	5.4
Stream	Chloride	21.6
Stream	Lead	23.3
Stream	DO	25.2
Stream	Nitrite	30.7
Stream	Low Flow Alterations	44.3
Stream	Manganese	238
Stream	Zinc	17.7
Stream	Selenium	218
Stream	Dioxin	348
Stream	Aluminum	899
Stream	PCBs	875
Stream	pH	1440
Stream	Iron	5207
Stream	Fecal/Bacteria	6403
Stream	Bio-Impairment	5688
Stream	CNA - Algae	103

Table 9 - Number of miles for the leading causes of West Virginia impaired streams
(shows causes with >100 miles impaired)

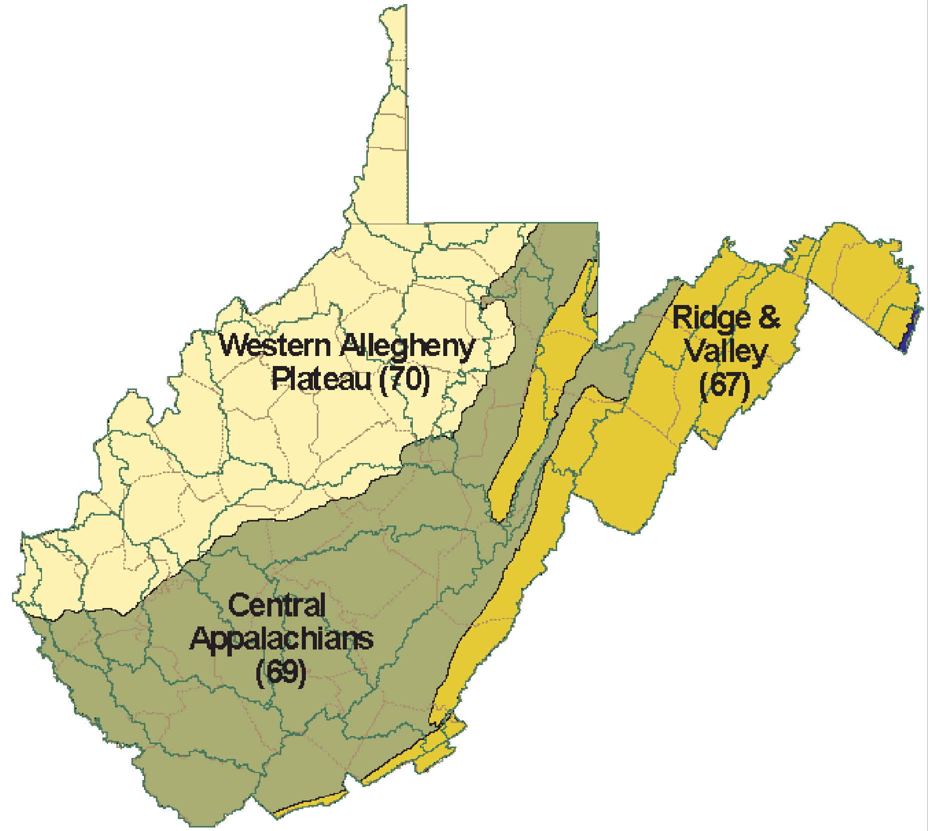


Probabilistic Data Summary

The probabilistic design used for this report was stratified to ensure adequate coverage across all watersheds and allows the state to characterize overall water quality conditions at the watershed (USGS 8-digit HUC) level in addition to providing statewide estimates of condition.   The goal of any probabilistic program is to provide statistically unbiased estimates of stream condition throughout a particular region (i.e., watershed, ecoregion or state) without assessing every single stream mile in that region. This approach can be used to describe various aspects of stream conditions including, the proportion of stream miles with biological impairment, the proportion of stream miles with specific water quality criteria violations, and the characterization of the relative importance of stressors such as sedimentation or acid precipitation.

In 2006, West Virginia completed its second 5-year cycle using a sample design that provided data from 750 sites from wadeable streams statewide. The target population for this effort was small to medium sized (1st-4th order) wadeable streams. Ninety-eight percent of West Virginia's stream miles are of this size class and approximately 70% of these are wadeable. This level of effort allows for estimations of conditions across the state with a high degree of confidence. The sites are spread across 25 watersheds and watershed groupings (some small watersheds are combined with adjacent ones) and allow estimates of conditions at this scale, but with lesser confidence. Six sites were sampled in each of the 25 watersheds each year, resulting in 30 samples per watershed at the end of the five-year design. While this design does allow for watershed level characterizations following the completion of the cycle, describing these estimates for the more broad classification of Level 3 Ecoregions reduces the uncertainties around the different estimates of condition. The DEP is currently in its third cycle of monitoring ambient conditions using the Probabilistic Method. This report summarizes the data from the last two years from the previous cycle (2002 – 2006) and the first three years from the third cycle (2007 – 2009) and are described in terms of ecoregions.

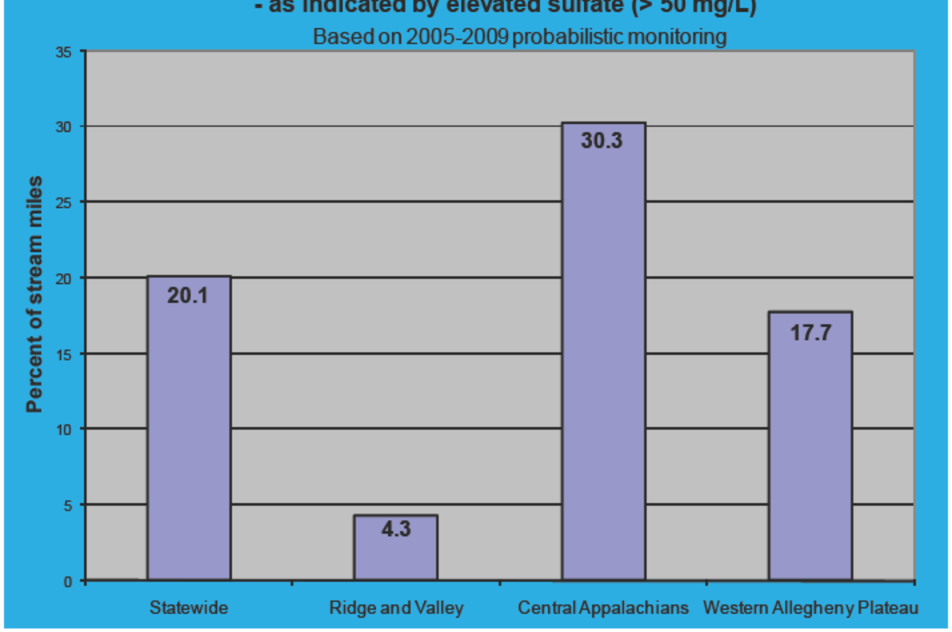
Figure 2– West Virginia's ecoregions map



Mine drainage

Mine drainage streams may be impaired by low pH and/or elevated concentrations of metals, including iron, aluminum, and manganese. Other dissolved ions such as sulfate may also be present in concentrations above ambient levels. A sulfate concentration greater than 50 mg/L was used to identify probabilistic sites influenced by mine drainage. Following this guideline, approximately 20.1% of the stream miles statewide are influenced by mine drainage (Table 10). Observed on an ecoregional basis, mine drainage influences a greater proportion of stream miles in the coal rich Central Appalachians (Ecoregion 69) than in the Ridge and Valley (Ecoregion 67) or Western Allegheny Plateau (Ecoregion 70). About 30.3% of the stream miles in the Central Appalachians are influenced by mine drainage. Contrastingly, about

Table 10

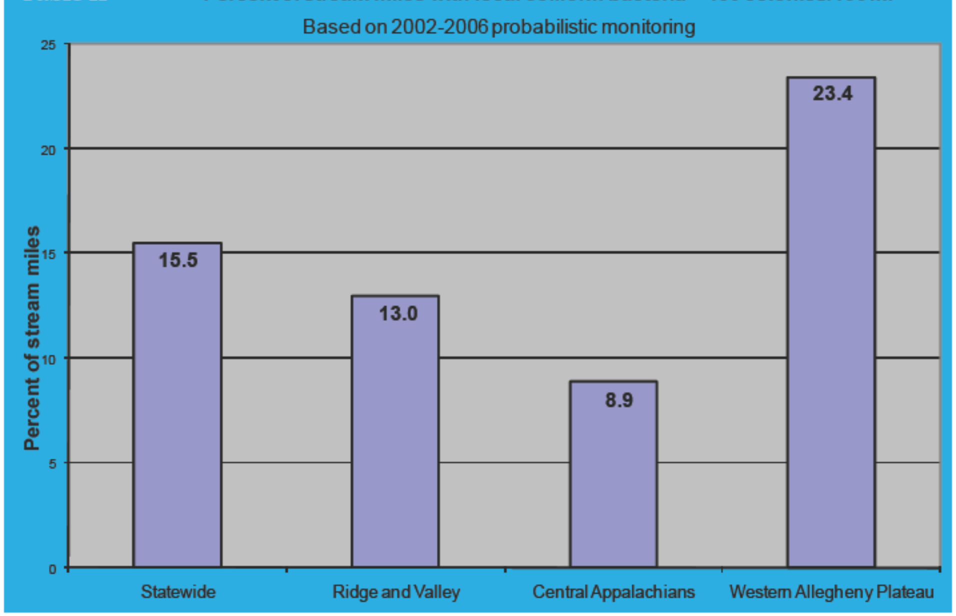


4.3% and 17.7% of stream miles are influenced by mine drainage in the Ridge and Valley and Western Allegheny Plateau, respectively.

Bacterial contamination

Many West Virginia waters contain elevated levels of fecal coliform bacteria. Contributors to the problem include leaking or overflowing sewage collection systems, illegal homeowner sewage discharges by straight pipes or failing septic systems, and runoff from urban or residential areas and agricultural lands. Based on probabilistic data, about 15.5% of stream miles in the state have fecal coliform bacteria levels that exceed the criterion of 400 colonies/100mL (Table 11). In general, watersheds in the more developed regions of the state had a greater proportion of stream miles exceeding the criterion. The proportion of stream miles violating the criterion was highest in the Western Allegheny Plateau Ecoregion (23.4% of stream miles) and somewhat lower in the Central Appalachians (8.9% of stream miles) and the Ridge and Valley Ecoregions (13.0% of stream miles). It should be noted that the probabilistic monitoring is performed at baseflow conditions. Because samples are not collected during storm runoff

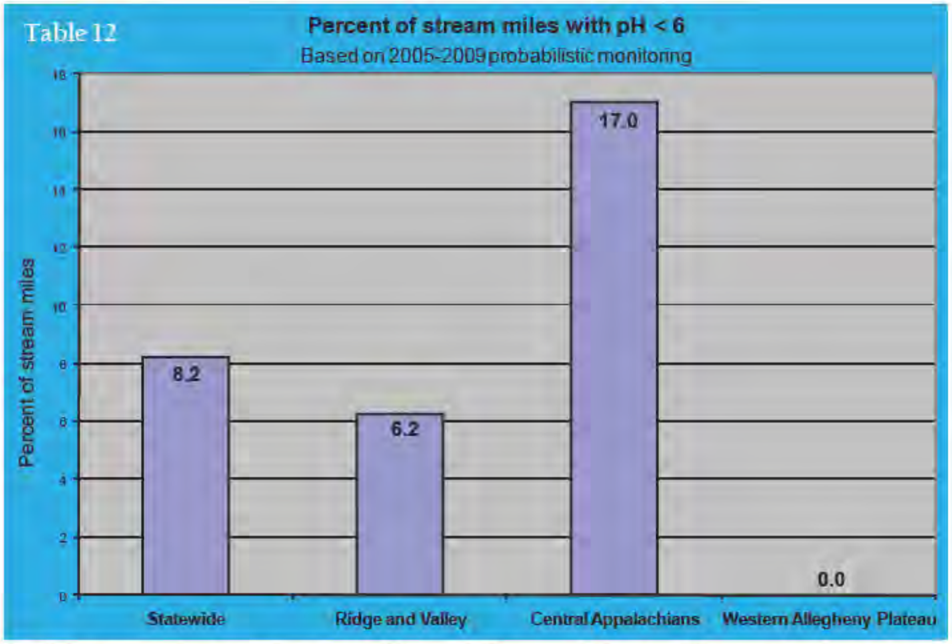
Table 11



events, bacteria levels that would likely increase under these higher flow conditions are not accounted for in this assessment.

Acidity

The aquatic life communities in the headwater sections of many West Virginia waters continue to be impacted by low pH acidic water quality. The impairment is most prevalent in watersheds with soils of low buffering capacity and most often caused by acid precipitation and less often (but more severely) by acid mine drainage. An evaluation of probabilistic data indicates that approximately 8.2% of the stream miles in the state have pH values below 6.0 (Table 12). Most of the stream miles identified as impacted by acidic waters are in the Central Appalachians Ecoregion, representing 17.0% of the stream miles within this area. Specifically, the Forested Hills and Mountains section of this ecoregion are largely susceptible to acid deposition impacts due to infertile soils and resistant sandstones of the Pottsville group. The Ridge and Valley Ecoregion is less susceptible to the impacts of acid deposition with geologic materials such as limestone and shale providing more buffering capacity to neutralize acid precipitation. Nonetheless, probabilistic data indicates that approximately 6.2% of the stream miles



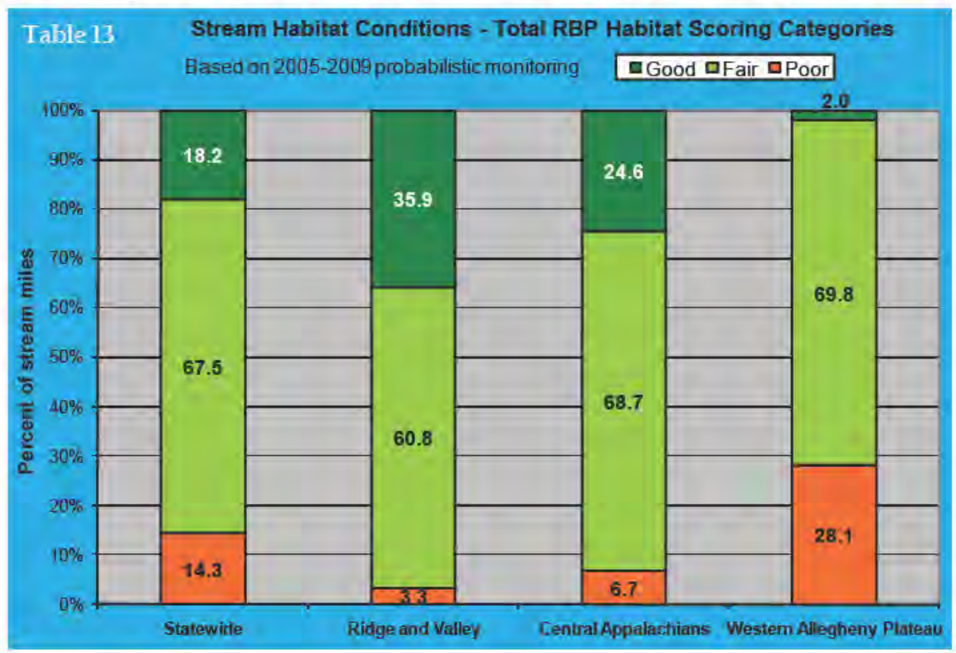
in this ecoregion are impacted by acidic conditions. There are almost no stream miles with impacts attributed to acidic conditions in the Western Allegheny Plateau ecoregion. Again, this ecoregion has well buffered soils that limit the impacts of acid precipitation and acid mine drainage.

Habitat quality

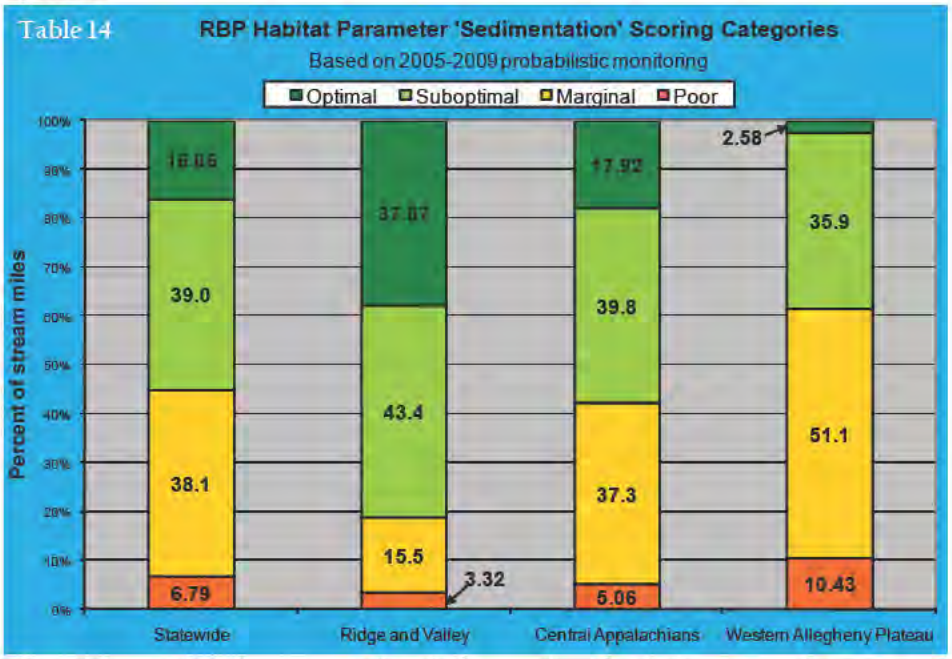
It is nearly impossible to accurately interpret the biological health of streams without measuring various aspects of habitat quality. During the course of probabilistic sampling, DEP personnel collected data on many features of both riparian and instream habitat known to be important to the biological communities of streams. Habitat parameters from the EPA's Rapid Bioassessment Protocol (RBP) were measured. These include measures of the amount of sediment and embeddedness in the stream channel as well as measures of the vegetation along the bank and riparian zone in the stream corridor. Specifically, ten characteristics are scored (0-20) based on their quality and then combined to assess the overall physical habitat condition of the site. The overall scores (Total RBP Habitat) were categorized as good, fair, or poor (Table 13). Based on probabilistic data, about 18.2% of stream miles have good habitat quality (total RBP score of 160 or greater), 67.5% of stream miles have fair habitat quality (110–159), and 14.3% of stream miles have poor habitat quality (< 110). While these categorical thresholds are somewhat arbitrary, they do provide a good comparison of one area to another.

The Ridge and Valley and Central Appalachians Ecoregions are similar with respect to overall habitat quality. Over 24% of stream miles in each of these ecoregions are of good quality and less than 7% are poor with respect to overall habitat quality. In comparison, habitat quality scores are lower in the Western Allegheny Plateau. The presence of more widespread development and factors such as higher rates of soil erosion in this ecoregion are potential causes for only 2% of its stream miles being rated as good in overall habitat quality. Additionally, the proportion of stream miles with poor habitat quality (28.1%) is substantially higher in this ecoregion. It is important to consider that the greatest proportion (over 97%) of stream miles in the state are in the fair or lower habitat categories. This indicates that most of the state's stream miles have at least some degree of habitat perturbation degradation.

Although the DEP may gain insight into overall habitat conditions by combining the individual measures, it is useful to examine specific



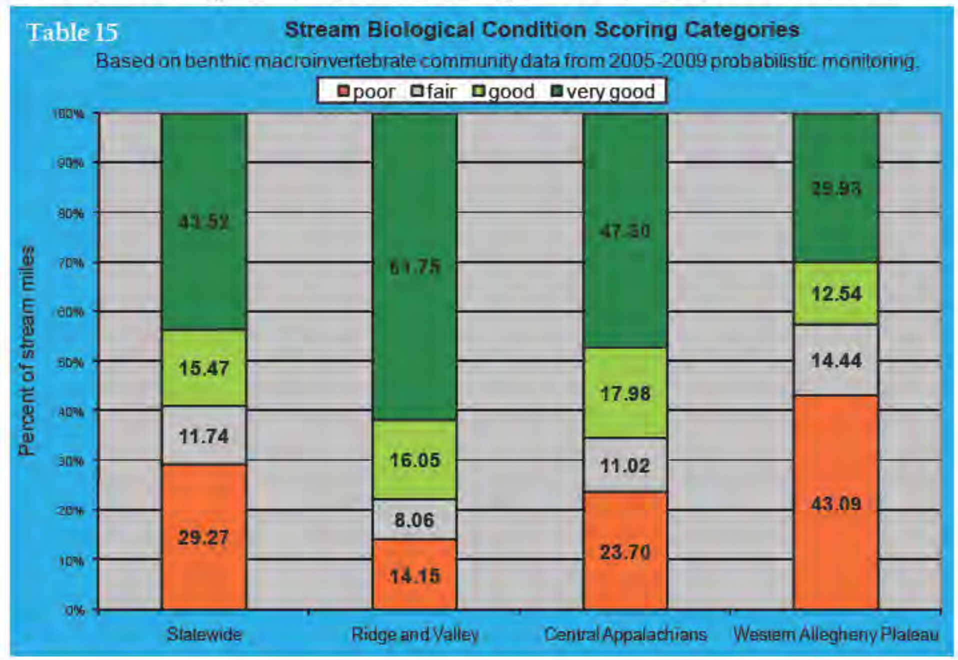
habitat characteristics. Sedimentation is one of the most significant problems facing West Virginia streams. Significant sources of increased sedimentation include agricultural activities, mining, logging, oil and gas, roads, urban and suburban development, and removal of stream bank and riparian vegetation. The effects of sediment deposition on stream biota are well known and include interference with respiration and the smothering of physical habitat and organism eggs. The categories used to rate the individual habitat characteristics are labeled as optimal, suboptimal, marginal, and poor (which match the field assessment forms). Sedimentation results for the state as a whole indicate that 6.79% of stream miles are in poor condition, 38.1% stream miles are marginal, 39% of stream miles are suboptimal, and 16.06% of stream miles are in optimal condition (Table 14). As with the overall habitat scores, the widespread impacts of sedimentation in West Virginia are apparent in that over 83% of the wadeable streams miles in the state score less than optimal.



The Ridge and Valley Ecoregion is better than both the Central Appalachian or the Western Allegheny Plateau Ecoregions regarding sedimentation. In the Ridge and Valley ecoregion, 37.87% of stream miles are in optimal condition and 3.32% are in poor condition. Results for the Central Appalachians are poorer than the Ridge and Valley ecoregion but better than the Western Allegheny Plateau Ecoregion, with 17.92% of stream miles in optimal condition and 5.06% of stream miles in poor condition. The Western Allegheny Plateau continued to show substantial problems in habitat quality. In contrast to the Ridge and Valley, less than 3% of stream miles in this ecoregion are in optimal condition and just under 61.53% of stream miles are in poor or marginal condition in terms of sedimentation. The presence of more widespread development and higher rates of soil erosion in this ecoregion are potential causes of the observed increase in sedimentation and resultant decrease in habitat quality.

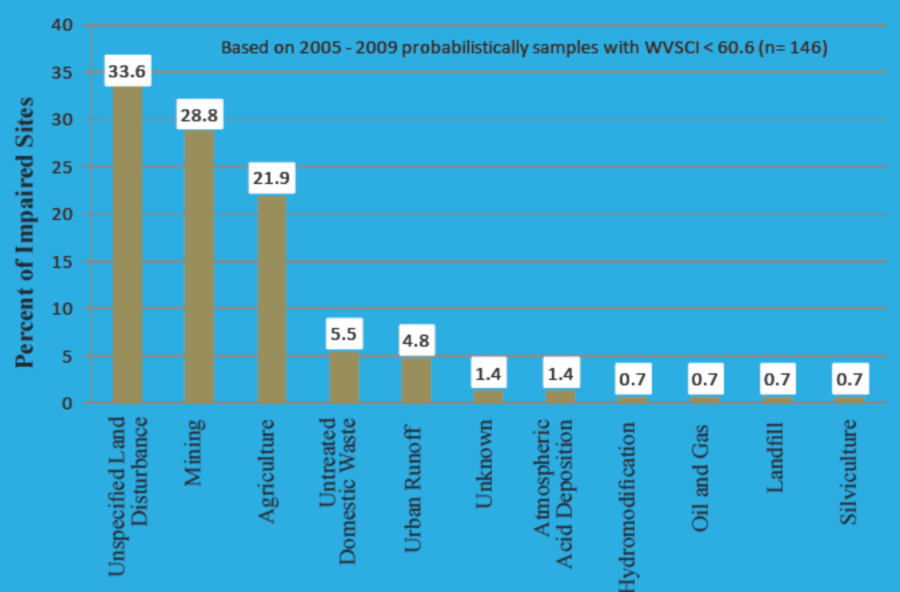
Biological impairment

The biological communities living in West Virginia streams are exposed to many stressors, including toxic contaminants, sedimentation, nutrient enrichment, and acid precipitation. The DEP uses benthic macroinvertebrates to assess the biological condition of streams in the state. These organisms provide reliable information on water and habitat quality in streams. They are extremely diverse and exhibit a wide range of tolerances to pollutants. Further, they serve as an excellent tool for



measuring overall ecological health, especially when summarized into a single index of biological integrity. In West Virginia, the health of benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams. The WVSCI is composed of six metrics (each measuring a different aspect of the community) that were selected to maximize discrimination between streams with known impairments and reference streams. Based on the WVSCI impairment threshold of 60.6 (0 –100 scale) WVSCI, about 29.27% of wadeable stream miles in the state are in poor condition (i.e. impaired), while 58.99% of stream miles are not impaired and 11.74% are inconclusive (Table 15). More than 43% (43.09%) of the wadeable stream miles in the Western Allegheny Plateau were impaired. In contrast, the Ridge and Valley and Central Appalachians ecoregions had substantially lower percentages (14.15% and 23.70%, respectively) of wadeable stream miles rated as impaired biologically.' Poorer habitat conditions in the Western Allegheny Plateau, especially those related to sedimentation, are likely to be at least partially responsible for the higher proportion of stream miles rated as impaired biologically.

Table 16 **Biological Impairment Sources**



Sources of bio-impairment

The results of the 2005 - 2009 probabilistic sampling revealed that 146 out of 530 samples received a WVSCI score of 60.6 or less. Benthic macroinvertebrate communities that score below this value are considered impaired, and the DEP would describe them as not supporting their aquatic life use designation.

Eleven categories of major sources of biological impairment were determined using water chemistry analyses, narrative descriptions by sampling personnel, benthic community characteristics, and several Geographic Information System data layers depicting land use activities. Each of the 146 sites was assigned a primary source of impairment from one of the 11 categories. For sites with possibly more than one source of impairment, the most obvious source was listed. Of the 146 bio-impaired sites, "unspecified land disturbance" affected almost 33 percent. Unspecified land disturbances are characterized by heavy sand and sedimentation associated with dirt roads, poor riparian zones, and highly eroded areas. The next highest sources of impairments are mining and agriculture.

Major Basin Summaries

Dunkard Creek

The DEP recently completed, and the EPA approved, Total Maximum Daily Loads for iron, fecal coliform, chloride and biological impairment related to sediment. The fish kills that occurred in in the fall of 2009 were a new development caused by golden algae (Prymnesium parvum) and its associated toxins.

The West Virginia Department of Environmental Protection and the West Virginia Division of Natural Resources, along with a number of other agencies, have investigated the cause of a substantial fish kill in Dunkard Creek, in Monongalia County.

Members of the public first reported seeing dead fish in Dunkard Creek and notified the DNR on September 1, 2009. At that time, staff from a variety of divisions from the DEP and the DNR visited the scene, began taking samples and started looking for a cause.

Because of mining activity in the area, the industry was an early suspect. In fact, after conferring with the DEP, Consol, which operates an active mine in Blacksville, W.Va., agreed to shut off its discharge into Dunkard Creek at its Blacksville No. 2 site. However, at the same time Consol was shutting off its pumps, dead fish were found upstream from its outlet, indicating that the outlet at that site is not the sole cause for the dead fish.

The agencies also received reports from area residents suspecting tanker trucks of dumping wastewater from oil and gas drilling activities into Dunkard Creek. Further investigation revealed those trucks that had been reported were withdrawing water from the stream, rather than dumping wastewater.

On Friday, September 18, 2009 staff members from the DEP flew over the area in a helicopter to see if there was anything they could see from the air that they missed on the ground. The staff noted the stream was clouded with a rust color from the Pennsylvania border upstream to a beaver dam in the South Fork of the West Virginia Fork of Dunkard.

In addition, investigators solicited the assistance of micro-biologists to help determine whether some form of algae or similar growth was a contributing factor. Toxins are sometimes produced by algae; and saline environments are sometimes involved with harmful algae blooms.

Additional water samples for golden algae taken on September 24, 2009 reconfirmed the presence of golden algae in amounts known to have caused fish kills in other states and countries. The DEP and other investigators have been assembling available scientific information on golden algae and the toxins it produces. As reported in available scientific literature, both the golden algae and the toxins it produces are influenced by environmental factors including the water's pH, temperature, salinity and nutrients. Toxin production mainly kills fish and appears to have little effect on cattle or humans.

Guyandotte River

The Guyandotte River is divided into upper and lower sections. The confluence of Island Creek and the Guyandotte River defines the boundary between the Upper and Lower Guyandotte watersheds - The impairments of the Upper Guyandotte River mainstem (fecal coliform, total iron and biological impairment) and the Lower Guyandotte River mainstem (fecal coliform, total iron) are addressed by TMDLs developed by EPA Region III in 2004. In that effort, EPA also developed TMDLs for numerous Guyandotte River tributaries predominantly impaired by mine drainage. Currently, there are 44 streams within the Upper Guyandotte Basin and 52 streams in the Lower Guyandotte Basin which are listed as biologically impaired and in need of TMDLs.

Kanawha River and major tributaries (New, Bluestone, Greenbrier, Gauley, Elk and Coal rivers)

The Kanawha River is divided into two major sections with the break occurring at the mouth of the Elk River. The Upper Kanawha Basin extends upstream to the confluence of the New and Gauley Rivers in Gauley Bridge. The Lower Kanawha Basin begins at the mouth of the Elk River and extends downstream to its confluence with the Ohio River in Point Pleasant.

The entire Kanawha River mainstem, Bluestone River and Bluestone Lake are listed as impaired because of fish consumption advisories related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs).

Fecal coliform impairments have been identified in portions of the Lower Kanawha River mainstem and in all of the major tributaries of the Kanawha River. Affected segments include the New River (mouth to Bluestone Dam), the Elk River (mouth to river mile 102.5), and the entire lengths of the Bluestone, Coal, and Greenbrier Rivers.

Previous EPA TMDL development efforts addressed dioxin impairments of the Lower Kanawha River and tributaries (September 2000) and metals impairments of the Elk River and tributaries (September 2001). The West Virginia Department of Environmental Protection finalized numerous TMDLs for impaired tributaries of the Upper Kanawha River in January 2005. Additionally, DEP developed TMDLs for the Coal River and numerous impaired tributaries that were approved by the EPA in September 2006. DEP also developed numerous TMDLs in the Gauley, New, Greenbrier and Bluestone watersheds in 2008.

Currently, all tributaries of the Lower Kanawha and Lower Elk, from Summersville Dam to the mouth, are being evaluated by the DEP for TMDL development. Once sampling and stressor identification are complete, all tributaries with impairments, other than ionic stress, will have TMDLs completed by December 2010 under the current schedule.

Monongahela River and major tributaries (Tygart and West Fork rivers)

Between March 2001 and September 2002, the EPA developed TMDLs addressing the iron, aluminum, manganese and pH impairments of the Monongahela, Cheat, Tygart and West Fork Rivers and numerous tributary waters.

Fecal coliform impairments have been identified in the Monongahela River (entire length), the Tygart Valley River (entire length), and the West Fork River (mouth to Stonewall Jackson Lake Dam). The same segment of the West Fork River is also biologically impaired and a consumption advisory related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs). Cheat and Tygart Lakes are listed for PCBs. The PCB listing of these lakes are based on elevated fish tissue concentrations and fish comsumption advisories. Recent fish tissue sampling has resulted in delisting of the Monongahela River for PCBs.

In Spring 2009, the DEP announced plans to develop TMDLs on all impaired tributaries of the Monongahela River from its beginning at the confluence of the West Fork River and Tygart River to the West Virginia/Pennsylvania border. Currently, water quality sampling and biological assessments are being conducted on all tributaries with known or suspected impairments. Once sampling is completed and all streams are assessed, the DEP will begin TMDL development for impaired waters. The DEP expects to submit the TMDLs to the EPA for approval by November 2012.

In March 2010, the DEP proposed a list of streams for TMDL development in the West Fork River Watershed. The streams were advertized in papers statewide seeking public input. A public meeting in the Summer of 2010 to present sampling plans and to address any questions or comments from the public. Pre-TMDL sampling began in July 2010 with draft TMDLs due to EPA by fall of 2013.

Cheat River Watershed TMDLs

The DEP and the EPA have initiated a large-scale revision of the Cheat River watershed TMDLs that the EPA developed in 2001. At present, pre-TMDL monitoring, impairment assessments, and source tracking and characterization activities have been completed and a work directive issued to perform water quality modeling. This effort is scheduled to be finalized in September 2010. The revision will involve re-evaluation of the metals and pH impairments associated with the 2001 TMDLs, in light of the aluminum and manganese water quality standard revisions that have occurred and the various water quality improvement projects in place throughout the watershed. In addition to the re-evaluation component, the new effort will also develop TMDLs for streams in the watershed where fecal coliform bacteria and/or biological impairments

have been identified. It is important to note that the pH water quality conditions of the Cheat River mainstem and Cheat Lake have shown dramatic improvement in recent times. The West Virginia Division of Natural Resources' limestone drum station on the Blackwater River and its application of limestone fines to headwater streams impacted by acid rain have restored many miles of trout water and pH data at the head of Cheat Lake has consistently indicated no impairment for the last four years. Several AMD restoration projects have also been completed in the watershed.

Little Kanawha River

A small headwater section from river mile 162 upstream to the headwaters is currently listed for pH impairment. The segment of the river from Burnsville Dam (river mile 132.6) downstream to the mouth is impaired by fecal coliform and has a fish consumption advisory for PCBs.

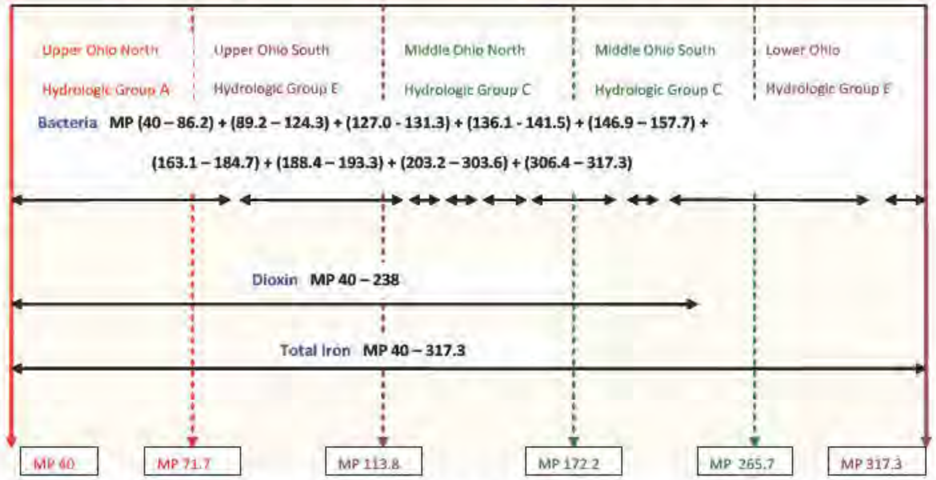
Previously, the EPA developed iron and aluminum TMDLs for the mainstem and several tributaries. The previously developed total aluminum TMDLs are now obsolete due to the criteria revisions that occurred in 2006. In addition, the DEP has received approval from the EPA for TMDLs on four additional tributaries (Copen Run, Duck Creek, Duskcamp Run and Lynch Run) for various impairments including: total iron, total manganese, pH and biological impairments.

Ohio River

In 2000 and 2002, EPA developed TMDLs for dioxin and PCBs, respectively for the Ohio River mainstem. The EPA TMDLs for dioxin included only sections of the Ohio River from the mouth of the Kanawha River downstream to the Kentucky state line. Additional sections of the river above the Kanawha River remain listed as impaired by dioxin. Currently, TMDLs have been or are being developed to address various impairments on many of the tributary streams.

The Ohio River Valley Water Sanitation Commission does extensive water quality monitoring of the Ohio River bimonthly. In addition, every two years, ORSANCO publishes a 305(b) report that provides assessments of the water quality based on ORSANCO water quality standards. As in the past, the DEP has reviewed the data and incorporated these assessments into the West Virginia Section 303(d) List.

Figure 3 - Impairments of the West Virginia section of the Ohio River



When both West Virginia and ORSANCO have an established criterion for a particular pollutant the most stringent standard is applied for assessment purposes and included in West Virginia's Section 303(d) List. For example, the bacteria impairment identified for various Ohio River segments is based upon both ORSANCO's E. coli. water quality criteria and West Virginia's fecal coliform criteria. In addition, the river continues to be identified as iron-impaired based upon the application of West Virginia's warmwater aquatic life criterion of 1.5 mg/l. Figure 3 depicts the impairments and segment lengths for the Ohio River bordering West Virginia.

Tug Fork River

In 2002, the EPA developed TMDLs for total iron and total aluminum for the Tug Fork River mainstem. In addition, total iron, total aluminum, total manganese and pH TMDLs were developed for its impaired tributaries. As noted earlier, subsequent revisions to the aluminum and manganese criteria have created uncertainty relative to the impairment status of affected waters and, as such, the validity of many the total aluminum and manganese TMDLs.

Currently, the Tug Fork is identified on the 2010 West Virginia Section 303(d) List for violations of the fecal coliform criteria and biological impairment. The fecal coliform impairment extends the entire length of the river and the biological impairment reaches from river mile 51.6 to the headwaters.

Interstate Water Coordination

Joint PCB monitoring and TMDL development effort with Virginia
DEP has been working with the Virginia Department of Environmental Quality (Va. DEQ) to assess Polychlorinated Biphenyls (PCBs) impairment along the Virginia section of the Bluestone River. The product of this cooperative effort will be a TMDL for the Bluestone River and tributaries with loadings and allocated reductions for sources in both Virginia and West Virginia. The USGS report detailing analytical method and sample results can be found at http://pubs.usgs.gov/of/2007/1272/pdf/OFR2007-1272.pdf. In addition, the DEP, Va. DEQ and EPA Region III have been cooperating in an effort to locate and reduce sources of PCBs to the Bluestone River. As part of this effort, remediation of the now defunct Lyn Electric Site in Bluefield, W.Va. has been completed. Efforts included leveling and removal of the electric motor remanufacturing buildings on the site. Also, contaminated water and debris were removed from the site and clean material used to backfill the open basement areas of the property. Within the watershed additional monitoring and source evaluation is on going to determine what steps need to be taken in the near future.

Ohio River Valley Water Sanitation Commission – ORSANCO
As with previous reports, the DEP's 2010 Integrated Report includes assessments based on data provided by ORSANCO. Throughout the development of ORSANCO's 2010 Biennial Assessment, the DEP has been involved with ORSANCO's efforts to standardize assessments among the "compact" states. The DEP's personnel continue to participate in several standing committees, along with representatives from other "compact states," charged with helping direct ORSANCO's water quality and biological monitoring efforts.

Chesapeake Bay
The Chesapeake Bay is impaired by nutrients and sediment from multiple sources originating locally and in upstream states. This biologically diverse waterbody is an important economic and recreational resource.

The need to restore this waterbody is a high priority for many agencies, organizations and the public in general. Fourteen percent of West Virginia's waters drain into the Potomac River and on into the Bay. In addition, portions of the James River Watershed in West Virginia contribute flow to the Bay.

In June 2002, Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding, committing West Virginia to the nutrient and sediment load reductions. The West Virginia Potomac Tributary Strategy, developed in November 2005, includes plans for nutrient and sediment reductions from a variety of state point and nonpoint sources. All other Bay jurisdictions have developed and are implementing similar plans. Many DEP programs are actively participating in the development of a Chesapeake Bay TMDL, which is scheduled to be completed in December 2010.

Interstate Commission on Potomac River Basin
The Commission is a non-regulatory agency of basin states (Maryland, Pennsylvania, Virginia and West Virginia), Washington, D.C. and the federal government. The Commission promotes watershed-wide solutions to the pollution and water resources challenges facing the basin and its more than 5.3 million residents. Examples of current commission efforts include the Chesapeake Bay Program involvement, stream biological assessments, support of selected stream gages, the Potomac Groundwater Assessment, Potomac Basin Drinking Water Source Protection Partnership coordination and Potomac Watershed Toxic Spill Model support. In addition, the Commission's public outreach program supports and helps coordinate an annual watershed-wide clean up effort and produces and distributes 150,000 copies of the newsletter Potomac Basin Reporter. The commissioners are appointed by their respective jurisdictions and provide policy guidance and oversight for a skilled staff of scientists and educators.

Ohio River Basin Water Resources Association

The association, in some form or another, was founded in 1981. The association works to: (1) provide a forum for Ohio River Basin states to study, discuss, and develop regional policies and positions on common interstate issues concerning water and related land resources; (2) coordinate to the extent possible water and related land resources planning in the Ohio River Basin; (3) provide representation of regional interest to the federal government; (4) investigate, study and review water related problems of the basin; (5) assist in water and related land resources training for basin representatives. The association welcomes membership from all states draining to the Ohio river including: Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia. Recently the organization has changed it name to the Ohio River Basin Water Resources Association and has signed a Memorandum of Understanding with ORSANCO to seek ways for the organizations to work together more efficiently.

Total Maximum Daily Load (TMDL) Development Process

From 1997 until 2003, EPA Region III developed West Virginia TMDLs under the settlement of a 1995 lawsuit, Ohio Valley Environmental Coalition, Inc., West Virginia Highlands Conservancy, et. al. v. Browner, et. al. The lawsuit resulted in a consent decree between the plaintiffs and the EPA that specifies TMDL development requirements and compliance dates. While the EPA was working on developing TMDLs, the DEP concentrated on building its own TMDL program. With the help of the TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL section within the Division of Water and Waste Management.

The TMDL section is committed to implementing a TMDL process that reflects the requirements of TMDL regulations, provides for the achievement of water quality standards, and ensures that ample stakeholder participation is achieved in the development and implementation of TMDLs. The DWWM's approach to TMDL development allows 48 months to develop a TMDL from start to finish. This approach enables the agency to carry out an extensive data generation and gathering effort to produce scientifically defensible TMDLs, and allows ample time for modeling, report drafting and frequent public participation opportunities.

The DEP's TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year, five-step process. The watersheds are divided into five hydrologic groups (A - E). Each group of watersheds is assessed once every five years. A map depicting the 32 watersheds and hydrologic groupings is provided as an attachment to this document before the List Key. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the NPDES permitting process and efforts toward limiting nonpoint source loading. Throughout the TMDL development process, there are numerous opportunities for public participation and input. Since its inception, the DEP's TMDL section pursued timely development of TMDLs for the waters and impairments identified in the consent decree between the EPA and the Ohio Valley Environmental Coalition, et. al. The TMDLs developed and approved in the Dunkard Creek, Upper Ohio River South, Youghiogheny, and Camp Creek portion of the Twelvepole Creek watersheds in 2009 fully accomplished the EPA's commitments under the consent decree.

The 303(d) list identifies and prioritizes the waters and impairments for which future TMDLs will be developed by specifying the year in the "Projected TMDL Year" column. The impaired waters intended for TMDL development in 2010, 2011 and 2012 are known and identified. For other waters and impairments, where the timing of TMDL development is less certain, the "Projected TMDL Year" is identified as the latest year where an opportunity exists per the DEP's plans to develop

TMDLs in concert with the Watershed Management Framework.

At any point in time, the DEP personnel is working on TMDLs in each of the five hydrologic groups (A-E). Each set of TMDLs moves through several stages of development prior to finalization and the EPA's approval. Table 17 shows the state's TMDL development progress.

The DEP's Web site contains all approved TMDL documents and the draft TMDL documents currently out for public comment. These documents can be found at http://www.dep.wv.gov/WWE/watershed/TMDL/Pages/default.aspx.

Table 17 - West Virginia TMDL development progress

Hydrologic Group	Watersheds	Progress
E1	Dunkard Twelvepole Upper Ohio South	U.S. EPA approved in 2009
A1	Youghiogheny	U.S. EPA approved in 2009
A2	Cheat	Allocation development process underway Draft TMDLs expected summer 2010
B2	Elk Lower Kanawha North Branch of the Potomac	In model development process draft TMDLs expected fall 2010
C2	Middle Ohio North Middle Ohio South	In model development process Draft TMDLs anticipated in 2011
D2	Monongahela	Pre-TMDL monitoring and source characterization ongoing (July 2009 - June 2010)
E2	West Fork (tentative)	Stream selection was advertised in March 2010

Water Pollution Control Programs

Division of Mining and Reclamation

The mission of the Division of Mining and Reclamation (DMR) is to regulate the mining industry in accordance with federal and state law. Activities include issuing both National Pollutant Discharge Elimination System and Surface Mining Control and Reclamation Act permits for mineral extraction sites and related facilities, inspecting facilities for compliance, monitoring water quality, tracking ownership and control, and issuing and assessing violations. The DMR is responsible for the computer databases that track the DMR's activities - Environmental Resources Information System and Applicant Violator System the federal database. The Permitting Unit is responsible for reviewing permit applications for surface and underground coal mines, preparation plants, coal loading facilities, haulage ways, and coal-related dams. This unit also reviews permit applications for non-coal quarry operations (sand, gravel, limestone, etc). Permit review teams staffed with geologists, hydrologists, engineers and others are located in each regional office throughout the state and in the headquarters office. The DMR's Inspection and Enforcement unit is responsible for inspecting all coal mining and quarry operations in the state. It enforces compliance through regular inspections and Notices of Violation, and ensures site reclamation through final release of the operation. This unit is also responsible for civil penalty assessments, show cause proceedings, bond forfeiture and collection. The DMR's Program Development unit is responsible for implementing a proactive approach to policy issues, legislation and training. This unit is designed to keep the Division staff current with technological advances and to provide clear direction through development of cogent policy and guidance to meet legal and regulatory requirements. This unit provides regulatory interpretation and support to field offices, develops and updates handbooks and forms, drafts legislation and initiates regulation changes. Other responsibilities of this unit include Small Operators Assistance Program, public relations, including responses to Freedom of Information Act requests, special projects, employee training and research of laws, regulations and policy.

Division of Water and Waste Management

The Division of Water and Waste Management's mission is to preserve and enhance West Virginia's watersheds for the benefit and safety of all.

The DWWM strives to meet its mission through implementation of programs controlling surface and groundwater pollution caused by industrial and municipal discharges as well as oversight of construction, operation and closure of hazardous and solid waste and underground storage tank sites. In addition, the division works to protect, restore and enhance the state's watersheds through comprehensive watershed assessments, groundwater monitoring, wetlands preservation, inspection and enforcement of hazardous and solid waste disposal and proper operation of underground storage tanks.

Environmental Enforcement (EE) is a branch of the Division of Water and Waste Management charged with assuring compliance with many of the state pollution control regulations. EE promotes compliance with the Solid Waste Management Act, Water Pollution Control Act, Groundwater Protection Act, Hazardous Waste Management Act, Underground Storage Tank Act, and Dam Safety Act by providing assistance, inspecting regulated sites, and enforcing conditions required by these acts.

National Pollution Discharge Elimination System (NPDES) Program

The DWWM's primary mechanism for controlling point sources is the West Virginia NPDES permitting program. This program, administered by the Permitting Branch, regulates activities and facilities involved in the installation, construction, modification, and operation and maintenance of wastewater treatment systems as well as their discharges. Individual and general permits are used to implement the program. Most permits include effluent limits and requirements for facility operation and maintenance, discharge monitoring and reporting. Other permits require the installation and implementation of best management practices in lieu of effluent limitations and discharge monitoring requirements. The Permitting Branch also administers a pretreatment program in conjunction with the NPDES program, which outlines procedures for regulating proposed industrial wastewater connections to publicly owned treatment works. The program imposes discharge limitations for indirect discharges and requires the installation of pretreatment facilities where necessary to prevent interference with POTW operations and sludge disposal practices and to ensure that the pollutants contributed by industrial users do not pass through the POTW and violate water quality standards. The National Combined Sewer Overflow (CSO) Policy is implemented as a component of the NPDES Permits for POTWs with CSOs. The DEP is also working with several state and federal agricultural agencies to develop a Concentrated Animal Feeding Operation (CAFO) permitting program. Activities administered by the Permitting Branch include the regulation of industrial solid waste landfills and the land application of sewage sludge, and developing wasteload allocations for new or expanding sewage treatment facilities. Below is a list of permit actions for the time period beginning in July 2007 and ending in June 2009.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
Report Date 02/12/2010

NPDES PERMITTING - PERMIT ACTION REPORT (7/1/2007 - 6/30/2009)

	Applications Received This Period	Applications Denied this Period	Permits Registrations and Modifications Issued This Period	Permits Registrations and Modifications Issued Year-to-Date for Current Fiscal 2010	Withdrawn and Voided This Period	Applications Pending as of 6/30/2009: Greater Than 180 dep days	Less Than, 180, > 90 dep days	Less Than, Equal to 90 dep days	Total (dep days)	Greater Than 180 total days	Average DEP Time to Issue Permits This Period (In Days)	Average Total Time to Issue Permits This Period (In Days)
INDIVIDUAL PERMITS	214	0	216	65	2	13	14	26	53	21	164	180
GENERAL PERMITS												
Home Aeration Units	590	2	556	1081	14	0	0	68	68	53	18	44
Sewage General	27	0	27	12	1	0	0	12	12	9	96	146
Storm Water Construction	1316	0	1285	317	30	0	1	68	69	12	27	33
All Others	937	1	517	670	20	1	6	441	448	59	81	141
MODIFICATION PERMITS	410	2	367	93	36	14	8	54	76	31	73	84
TRANSFER PERMITS	342	0	330	31	10	1	1	27	29	9	17	36
TOTAL - PERMITS	3835	5	3300	2269	113	29	30	716	775	194		

NOTE: The permits used to calculate for the "Average DEP Time" column are those that were submitted after June 30, 1999, when ERIS was deployed for Division of Water and Waste Management.

In addition to permitting, compliance assessment and enforcement activities are coordinated between the Permitting Branch and Environmental Enforcement. Noncompliance is initially addressed by administrative actions to compel compliance. These may include warning letters, notices to comply, enforcement orders, or referrals for civil action.

Nonpoint Source Control Program

The Nonpoint Source Control Program focuses on restoration and protection of streams from nonpoint source pollution. The program assesses nonpoint source impacts, then develops and implements watershed based plans and projects designed to reduce pollutant loads from agricultural, silviculture, resource extraction, urban runoff, construction activities, and failing septic systems. Program initiatives are based upon education, technical assistance, financial incentives, demonstration projects, and enforcement, as necessary. The division's Nonpoint Source Program supports overall administration and coordination of the nonpoint source activities through these participating state agencies: the West Virginia Conservation Agency, the Office of Oil and Gas, and the Division of Health and Human Resources. Each year, specific activities are funded under the Nonpoint Source Program. Many of the streams being listed on the state's list of impaired waters are affected by nonpoint sources. The majority of the Total Maximum Daily Loads being developed involve nonpoint source water quality impacts. To more effectively respond to TMDL implementation needs, the Nonpoint Source Management Plan was updated in 2000 to incorporate watershed management principles, including integration of TMDL and Watershed Management Framework scheduling. Since then, the Nonpoint Source Program has developed 16 watershed based plans that address a variety of nonpoint sources of pollution. These plans are developed in cooperation with the stakeholders, including federal, state and local government agencies, within the watershed. As a result of these plans, numerous nonpoint source remediation projects for acid mine drainage, agriculture, streambank erosion, and dirt roads have been undertaken. The goal of the watershed based plans is to restore the impaired streams to meet water quality standards. The successes to date emphasize the need to focus more resources on voluntary installation of best management practices in identified priority watersheds where local stakeholders are interested in making a difference.

Groundwater Program

Under the Groundwater Protection Act, West Virginia Code Chapter 22, Article 12, Section 6.a.3, the DEP is required to provide a biennial report to the Legislature on the status of the state's groundwater and groundwater management program, including detailed reports for each agency that has groundwater regulatory responsibility. The current biennial report to the Legislature covers the period from July 1, 2007 through June 30, 2009. Copies of the report "Groundwater Programs and Activities: Biennial Report to the West Virginia 2010 Legislature" may be obtained by contacting the Groundwater Program at the Division of Water and Waste Management, 601 57th St., Charleston, WV 25304 or by calling (304) 926-0495. The report also may be reviewed at http://www.dep.wv.gov.

The Groundwater Program is responsible for compiling and editing information submitted for the biennial report. The DEP, the West Virginia Department of Agriculture and the West Virginia Department of Health and Human Resources all have groundwater regulatory responsibility and contribute to the report. These state boards and six standing committees currently share the responsibility of developing and implementing rules, policies and procedures for the Ground Water Protection Act (1991). The Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Nonpoint Source Coordinating Committee are the standing committees. The report provides a concise, thorough overview of those programs that are charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia.

The Ambient Groundwater Quality Monitoring Network was established by the DWWM in cooperation with the USGS in 1992 and is an ongoing project. The network provides critical data needed for proper management of West Virginia's groundwater resources. The major objective of this USGS study is to assess the ambient groundwater quality of major systems (geologic units) within West Virginia and to characterize the individual systems. Characterization of the quality of water from the major systems helps to:

- Determine which water quality constituents are problems within the state
- Determine which systems have potential water quality problems

- Assess the severity of water quality problems in respective systems
- Prioritize these concerns

Only by documenting present ambient groundwater quality of the state's major systems can regulatory agencies assess whether water quality degradation has occurred in certain areas and whether potential degradation is a result of natural processes or those associated with human activity. Spatial variability in water quality is determined for specific geologic units based on sampling of approximately 30 wells annually. The sampling continues over a period of approximately six years and provides a database of more than 200 wells from which comprehensive water samples are collected. Wells are selected in specific drainage basins in given years, rotating annually to new basins, thus providing sampling of groundwater in all watersheds of the state over the five year period. Then, the cycle of sampling begins again. All associated groundwater quality data for each well sampled and summaries of groundwater quality for each respective watershed are published in the USGS Water Resources Data for West Virginia annual report.

Cost Benefit Analysis

A true cost/benefit analysis on the economic and social costs and benefits of water pollution control is a difficult and time consuming task. Particularly, the evaluation of industrial facilities would be a monumental task considering the various types of industry (mining, chemical, power generation, etc), each having a very different process of pollution control. However, the information contained in the following paragraphs provides an idea of the amount of money currently expended to construct and upgrade both the municipal facilities within the state as well as programs available to homeowners wanting to correct failing onsite sewage systems.

Funding for Water Quality Improvements
The DEP is responsible for administering a combination of state and federal funds expended for projects to improve water quality in state streams. The following narrative provides an overview of the programs within the DEP's Office of Water and Waste Management that provide funding for water quality improvements and a summary of the funds dispersed between July 2007 and June 2009 to improve water quality.

Clean Water State Revolving Fund Program
Clean Water State Revolving Fund (CWSRF) program is a funding program administered by the State Revolving Fund Branch to address water quality problems through wastewater facility construction, upgrades, or expansions. The branch is charged with general oversight, fiscal management and administrative compliance review of local governmental entities that receive funds and provides information and guidance on what administrative actions are needed to process a loan through the program. When a community has been recommended by the West Virginia Infrastructure and Jobs Development Council to seek CWSRF program funding for financial assistance, the community is contacted by a financial manager. A meeting may be scheduled to advise the community leaders about the overall program requirements and specifically what they should do next to obtain a CWSRF loan. There are federal, state, and program requirements that must be met prior to scheduling a loan closing. The CWSRF currently has three financial assistance programs available. These programs are described below.

Low Interest Loan Program
A low interest loan program for construction of municipal wastewater treatment works is available for municipalities and public service districts to build, upgrade, or expand treatment facilities and collection systems. Conventional loans with a repayment period of 20 years are available with an interest rate and annual administrative fee not exceeding 3% for certain communities. Loans with repayment periods from 21 to 40 years are available for disadvantaged communities where financial affordability is an issue. The interest rate and annual administration fee on these loans do not exceed 1/2%. From July 2007 through June 2009, 35 wastewater treatment facility loans totaling $85,807,285 were funded.

Agriculture Water Quality Loan Program

The Agriculture Water Quality Loan Program is a partnership with the West Virginia Conservation Agency developed to address pollution from nonpoint sources using Best Management Practices approved by the U.S. Environmental Protection Agency. CWSRF money is loaned to participating banks so they can offer below market rate low interest loans to qualifying applicants. For more information, contact your local Conservation District office, http://www.wvca.us/directory/cdo.cfm. From July 2007 through June 2009, 31 nonpoint source agriculture BMP loans totaling $1,615,118 were funded.

Onsite Systems Loan Program

In cooperation with the West Virginia Housing Development Fund, a low interest loan program has been established to address onsite sewage disposal problems. Called the "Onsite Systems Loan Program," loans up to $10,000 are available to replace malfunctioning septic systems and to install new onsite sewage systems for homes that have direct sewage discharges to ditches and streams. Centralized treatment for these homes will not be available in the next five years. For the current reporting period of June 2007 through June 2009, a total of 62 systems were funded at a cost of $407,409.

In conclusion, although funding for maintenance and improvement of water quality is often a controversial issue, the DEP recognizes that millions of dollars are expended annually by businesses, municipalities, private and public entities (including state and federal agencies) to improve and maintain water quality in West Virginia. These expenditures address pollutants from various media including solid and hazardous waste, air and water.

Public Participation and Responsiveness Summary

The draft Section 303(d) List was advertised for public comment from March 15, 2010 through May 19, 2010. This period included a 30-day extension granted by the agency after requests for additional time to fully develop comment submissions were received from multiple entities. Legal notices of the availability of the draft document were placed in newspapers statewide, including requests for public comment. The draft document was promoted via news release, e-mail and the Internet. At the conclusion of the public comment period, the DEP considered all comments and made adjustments to the list where appropriate.

Table 18 identifies all entities that provided comments. All relavant comments have been compiled and responded to in this responsiveness summary. The DEP appreciates the efforts commenters have put forth to improve West Virginia's listing and TMDL development processes. Comments and comment summaries are bold and italicized. Agency responses appear in plain text.

Table 18 - 2010 Section 303(d) List Commenters

Argus Energy WV, LLC	Patriot Coal	Linda Lee Elliston Emrich
ICG Beckley, LLC	PPG Industries	City of White Sulphur Springs
Town of Ronceverte	Arcelor Mittal	West Virginia Manufactors Association
Tunnel Ridge, LLC	Arch Coal, Inc.	West Virginia Chamber of Commerce
Arthur W. Dodds	Pamela C. Dodds	West Virginia Coal Association
Duane Nichols	Hunter Ridge	American Electric Power
Kim Shiemke	Tom Danek	

The following issues were raised by commenters relating to the listing of numerous state waters for mercury:

- ***The use of total mercury fish tissue results to assess a methyl mercury criterion.***
- ***The use of fish tissue fillet results to assess to assess a total organism body burden criterion.***
- ***The lack of a demonstrated > 10% rate of exceedance for methyl mercury in the most recent sampling of fish from the Kanawha River.***
- ***The use of individual composite sample results rather than a trophic level weighted geometric mean for assessing impairment.***
- ***The use of ORSANCO's total mercury data and more restrictive 0.3 ug/g standard to assess methyl mercury impairment on the Ohio River.***

The existing mercury listings for West Virginia waters were based on total mercury sample results from composites of fish fillets. Previous listings were based on the EPA guidance recommending states could equate total mercury levels in fish tissue to methyl mercury levels. In the guidance, the EPA suggested that total mercury concentrations in fish tissue could be assumed to represent methyl mercury concentrations for the purpose of listing. Language from the EPA document Water Quality Criterion for the Protection of Human Health: Methylmercury (2001) states in part "the MSRC concluded, based on research conducted by Bloom (1992) and Morgan et al. (1994), that over 90% of the mercury present in fish and seafood is methyl mercury. Thus, total mercury concentrations are considered appropriate for evaluation of methyl mercury exposure in human populations."

However, the DEP recognizes that proper assessments must be made in accordance with approved water quality standards. In the case of mercury, comments correctly point out that the criterion calls for whole fish samples, analyzed for methyl mercury. Studies were provided indicating mercury concentrations in fillets may be higher than those in whole body samples and that the methyl mercury to total mercury ratio in fish tissue may not be as high as the EPA's general statements indicate. As such, the DEP cannot conclude that the standards have been properly applied, and will remove existing listings for mercury.

The DEP is in the second year of a two-year study to evaluate statewide advisories for mercury and will analyze a percentage of fish collected for both methyl and total mercury to determine an appropriate ratio for future assessment purposes. However, all current fish consumption advisories will remain in place.

As the agency is proposing delisting of mercury impairments based upon the total/methyl and fillet/whole body issues, the requests for delisting based upon exceedence frequency and averaging are moot at this time. However, the DEP does not agree that the listing methodologies for water column numeric criteria would be appropriate for consideration of fish tissue results. The EPA mercury implementation guidance relative to trophic level weighting will be considered in future assessments.

The Ohio River listings were included to honor the initial draft assessments made by ORSANCO for portions of the Ohio River. The DEP has since been informed by ORSANCO of its plan to change the original assessments for mercury and proceed with additional sampling to better understand the relationship of total to methyl mercury for Ohio River fish. As such, the DEP has also removed the Ohio River mercury listings from the draft list.

Two commenters requested the removal of the CNA-Algae listing for the Greenbrier River (WVKNG). One commenter stated that the condition "does not constitute a danger at this time." The second commenter stated that they believe "the river is not failing to meet its designated uses."

The DEP does not agree with these comments. As described in the Narrative Water Quality Criteria - Greenbrier River Algae section of this document, the DEP believes that the excessive growth of algae does constitute a loss of designated uses for the listed segment of the Greenbrier River. The DEP has determined the existence of conditions prohibited by 47 CSR 2 Section 3.2 and causation by a pollutant. The state's Environmental Quality Board in a recent ruling (Appeal Nos. 09-05-EQB and 09-08-EQB) called the problems in the Greenbrier River undeniable and stated that designated uses have been jeopardized. As such, the DEP is retaining the Greenbrier River listing.

The classification of Big Sandy Creek (WVMC-12) as a trout stream was disputed because it is not listed in Appendix A of 47 CSR 2 and is not believed to be a cold water fishery. The delisting of iron, dissolved aluminum and pH impairments was requested.

The commenter correctly stated that available water quality monitoring data for Big Sandy Creek does not indicate impairment pursuant to dissolved aluminum criteria for warmwater fisheries and that Big Sandy Creek is not included in Appendix A of 47 CSR 2. Appendix A is not a comprehensive lists of trout waters and the DEP applies the trout water designated use and associated criteria to any stream believed to meet the definition at 47CSR2 – 2.19:

> *"Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.*

Alternatively, a stream that currently does not support year-round trout populations may also be properly classified as a trout water if that use was documented to be an existing use pursuant to the definition of "Existing uses" at 47CSR2 – 2.6 and the Tier 1 protection requirements of the Antidegradation Policy at 47CSR 2 – 4.1.a:

> *(2.6) "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included in the water quality standards.*
>
> *(4.1.a.) Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.*

When classifying trout waters, the DEP relies heavily on the guidance of the Division of Natural Resources. After receipt of the comment, the DEP reviewed available documentation and consulted with the Division of Natural Resources. Both agencies agree that Big Sandy Creek is more appropriately classified as a warmwater fishery. As such, the dissolved aluminum (trout) impairment was removed from the list. Iron and pH impairments remain indicated as "TMDL Rev." because existing

TMDLs previously developed by the EPA are being reevaluated in the Cheat River Watershed TMDL development project. Within that project, reevaluation will be based upon the criterion for warmwater fisheries.

Two commenters requested delisting of the iron impairments of the Ohio River. The following issues were raised:

- **Available data for certain pools does not demonstrate a greater than 10% rate of exceedance**
- **Available data at certain locations indicates no violations in the past two years**
- **The great majority of the iron in the Ohio River (Upper North) is naturally occurring and due to runoff of surface soils into the River**
- **Iron concentrations in the Ohio River (Upper North) do not pose a threat to human health or aquatic life and do not demonstrate that an impairment exists.**

In the West Virginia 2008 Section 303(d) List, the entire length of the Ohio River is listed as impaired for iron. Delisting requires adequate documentation that the impairment no longer exists. The data available for assessment is generated by ORSANCO and includes multiple locations. The WVDEP's listing methodology is point-based rather than pool-based.

Over the five year assessment period for the 2010 Draft 303(d) List, a greater than 10% rate of exceedance of the West Virginia iron water quality criteria was observed at mile points 42.6, 84.2, 126.4, 203.9 and 341. A less than 10% rate of exceedance was observed at mile points 54.4, 161.8 and 279.2. The West Virginia listing methodology extends an impaired condition in both directions until a non-impaired condition is observed. Based on that methodology, the entire length of the Ohio River is impaired for iron.

The listing methodology provides flexibility to override a five year assessment if no violations are observed in the most recent two-year period and the agency is convinced the impairment no longer exists. One commenter correctly stated that no iron violations are observed at mile point 84.2 from July 2007 to June 2009. However, the agency is not convinced that monitoring during that period confirms a non-impaired condition. Monitoring at mile point 84.2 on March 17, 2010 revealed a total iron result of 3.296 mg/l. In addition, further examination of the Ohio River data obtained from ORSANCO indicates a positive relationship between total suspended solids (TSS) and total iron. The relationship shows that as TSS values rise there is a corresponding increase in total iron values. Samples obtained in the last two years have not captured TSS values reaching the levels noted in previous samples with iron violations. As such, the DEP cannot state with confidence that the current iron levels in the Ohio River no longer violate water quality criteria. In the evaluation performed in response to these comments, the DEP determined that it erred when proposing delisting of a portion of the lower segment of the Ohio River and is retaining the entire length impairment of the 2008 list.

The DEP is aware that iron is present in native soils and sediment from numerous sources can cause violations of the water quality standards. However, the current EPA approved water quality criteria for West Virginia is total iron and according to federal regulations must be used in assessing waters for Clean Water Act purposes. The DEP does not have conclusive information that observed iron concentrations in excess of criteria are naturally occurring. The 2010 Draft Section 303(d) List must be based on effective water quality standards, which currently do not include a site-specific criterion for iron in the Ohio River.

Several commenters requested that DEP implement a Total Dissolved Solids (TDS) standard to protect the environment.

West Virginia does not currently have a TDS standard applicable to its waters. Without a standard, the DEP cannot list a stream on the impaired streams list for TDS. A TDS criterion has been recommended in the state's triennial review of water quality standards.

A perceived lack of action by the DEP was expressed in regard to several streams in the Dunkard and Monongahela watersheds that the

commenter believes are impaired.

The DEP has previously listed many of the streams/impairments noted in the comment and the EPA and/or the DEP have developed TMDLs as identified in Supplemental Table B. The DEP is currently pursuing a new TMDL development project for impaired tributaries of the Monongahela River. This effort will reevaluate TMDLs developed by the EPA in 2002 and will also address newly identified impairments. A comprehensive "Pre-TMDL" monitoring program has just been accomplished but was not available for assessment in the 2010 cycle. This data is being assessed now and identified impairments will immediately proceed to TMDL development. The impairments will be identified on the 2012 303(d) list and TMDLs are planned to be finalized by December 31, 2012. In summary, all waters named by the commenter either have or are having TMDLs developed.

A commenter requested that "the DEP recognize and emphasize the role of sediment and turbidity as causes for stream impairment." The commented also requested NPDES permitting and enforcement program enhancements to restrict discharges of storm water associated with construction activities in sensitive areas.

The DEP recognizes the role that sediment plays in stream water quality. Elevated suspended solids can be associated with exceedances of total iron water quality criteria and sedimentation is often determined to be a significant stressor of biologically impaired streams when TMDLs are developed. However, stream-specific cause and effect relationships cannot be accurately determined with the limited information that is available at the time of listing. In the TMDL development process, streams listed for iron and/or biological impairment undergo evaluation of sediment contributions both from upland sources and streambank erosion. After extensive modeling, TMDLs establish allocations for existing point and nonpoint sources that are necessary to restore designated uses. The Construction Stormwater General Permit requires application of Best Management Practices (BMPs) that are designed to minimize water quality impacts. TMDLs also address new discharges and include requirements that limit the amount of disturbed area concurrently registered under the Construction Stormwater General Permit.

Multiple commenters stated that the WVSCI is an inappropriate mechanism for assessing narrative criteria because it has not been promulgated as a water quality standard by the West Virginia Legislature and has not been subject public notice and comment.

The basis for biological impairment listings is the narrative water quality criterion at Title 47 Series 2 Section 3.2.i of the Code of State Rules, which prohibits significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. This narrative criterion is a valid water quality standard that was promulgated by the West Virginia Legislature and approved by the EPA.

Under the Clean Water Act and implementing regulations, the DEP must assess State waters with respect to attainment of water quality standards via comparison of available information to both numeric and narrative water quality criteria. The DEP initiated biological integrity assessments in the 1998 Section 303(d) list. The WVSCI was first used in the 2002 Section 303(d) listing process and has remained as an integral component of all subsequent 303(d) lists. The DEP's position has not changed relative to its responsibility to list waters where available data indicates significant adverse impact to their biological components. Furthermore, list approval by the EPA is expected to be contingent upon our continued implementation of this practice.

The WVSCI was specifically designed to accomplish assessment with respect to the 47CSR2 - 3.2.i criterion and remains the best scientific tool available to the DEP for that purpose. It was developed for the EPA and the DEP by national experts in the assessment of biological integrity through the evaluation of benthic macroinvertebrate communities. It is similar to the multi-metric indices used by many states and its component metrics are both validated and widely used nationally when assessing biologic health of aquatic systems.

Over the long period of WVSCI application, there have been numerous

opportunities for public notice and comment. Prior to the 2010 effort, the WVSCI has been applied in four West Virginia Section 303(d) lists and each of those processes included public notice and comment provisions. Previous Section 303(d) lists have generated public comments relative to biological impairment and application of the WVSCI. The DEP conscientiously considered and responded to all such comments. The EPA reviewed public comments and the DEP responses and, in their list approvals, concluded that the DEP properly assessed biological data and properly considered and responded to public comments.

A commenter contended that the DEP's sole reliance on the WVSCI methodology constitutes an improper evaluation of the overall biological integrity of an aquatic ecosystem which requires a more comprehensive assessment to include habitat and fish populations. The following excerpt from DEP Cabinet Secretary Randy Huffman's June 25, 2010 testimony to the Senate Committee on Environment and Public Works, Subcommittee on Water and Wildlife was also included to support the comment:

> ***These tools are just that, tools. They are not stand alone determinants of compliance with the narrative criterion. Any application of these assessment tools in determining compliance with the narrative criterion must faithfully apply the language of the standard itself, which prohibits significant adverse impacts on the biological component of the aquatic ecosystem.***

The commenter also included excerpts from a recent resolution of the West Virginia Legislature and suggested that the use of WVSCI "wholly disregards the Legislature's mandate as expressed in House Concurrent Resolution No. 111 and simultaneously betrays the very spirit and intent of the WVWPCA."

In reference to Secretary Huffman's Senate testimony, the commenter omitted text that is contextually important. The theme of the paragraph disputed conclusions that result from application of the draft GLIMPSS methodology. Preceding the excerpted text, the paragraph clearly indicates two points: GLIMPSS has not been put into regulatory use and the DEP uses the WVSCI to assess biological integrity under the narrative water quality criterion. The concluding sentence of the paragraph states:

> *In that regard, the WVDEP considers streams with less than 60.6 as biologically impaired.*

The DEP's use of WVSCI to assess 47CSR2-3.2.i is consistent with the Secretary's testimony.

House Concurrent Resolution No. 111 was directed to the United States Environmental Protection Agency in response to federal guidance suggesting conductivity measurement to gauge potential to violate narrative requirements. Nonetheless, the DEP's use of WVSCI to assess 47CSR2-3.2.i is consistent with the Resolution. WVSCI is an Index of Biological Integrity (IBI) for benthic macroinvertebrates. Benthic macroinvertebrates are aquatic life and afforded Clean Water Act protection. Failing WVSCI scores indicate nonsupport of the aquatic life designated use and nonattainment of the narrative criterion at 47CSR2-3.2.i. Under WVSCI, benthic macroinvertebrates are evaluated to determine the balance of the aquatic community. Multiple metrics measure species diversity, with favorable scores indicating the community "is diverse in species composition" and "the aquatic community is not composed of only pollution tolerant species." Favorable scores also demonstrate assemblages that are sufficient to perform biological functions necessary to support fish communities. The DEP has not developed or implemented a fish IBI for West Virginia waters. While a fish IBI might be useful in non-wadeable streams or other habitats that do not support the WVSCI protocol, fish community assessment is not a prerequisite or substitute for benthic macroinvertebrate assessment in habitats that support the WVSCI protocol. In fact, WVSCI assessment indicating impairment provides evidence of ecosystem imbalance and adverse impact to higher trophic level organisms.

The Legislature resolved that interpretation of narrative water quality standards is the responsibility of the DEP and that interpretation must

faithfully balance the protection of the environment and economic development. The DEP's historic and continued use of WVSCI to scientifically assess attainment of water quality standards does not violate the Legislature's statement of public policy as contained the West Virginia Water Pollution Control Act.

General and stream-specific comments were received suggesting the DEP should not use a single biological sampling event to list a stream as biologically impaired. The following streams were requested to be removed based on a single WVSCI sample: unnamed tributary (unt) of Birds Creek (WVMT-12-H-1), Hackers Creek (WVMT-26), Buffalo Creek (WVPSB-5), Parker Branch (WVO-2-Q-18-D) Maynard Branch (WVO-2-Q-23).

Given the magnitude of the DEP's responsibilities for watershed assessment, it would not be practical to demand multiple biological monitoring events at a single location prior to assessment. The design of the WVSCI allows an individual sample, qualified as comparable per its methodology, to discriminate departure from the reference condition and to be used for impairment decisions pursuant to the narrative criterion of 47CSR 2 - 3.2.i. The DEP has used this methodology to make assessment decisions on hundreds of single samples events over the last ten years in previous 303(d) lists with each list receiving the EPA approval.

The DEP does not conduct a biological assessment when suspect conditions jeopardize the validity of assessment under the WVSCI. For example, if it is known that streams have been dry for extended periods or have been scoured by a recent flood, the DEP does not perform biological monitoring. Additionally, to be considered comparable, the depth of sample areas cannot be greater than the height of the net and the flow must be sufficient to carry dislodged macroinvertebrates into the net. All biological monitoring data is extensively screened for comparability to WVSCI thresholds before it is used.

One commenter provided references to the Programmatic Environmental Impact Statement for Mountaintop Mining and Valley Fills in Appalachia (MTM/VF EIS), a supplemental study supplied by a member of the coal industry, and an academic study published after the MTM/VF EIS. The commenter contended that the referenced documents show that mountain top mining and valley fills do not cause biological impairment and therefore, the DEP's assessment of biological impairment through the use of the WVSCI is flawed. Based upon the supplemental studies, the commenter characterized the WVSCI as a "measure of change, not impairment" and opined that "a mere shift" in the biological community should not be equated to impairment because the designated use of the stream remains viable.

The following reference to the MTM/VF EIS was provided:

> ***Further, the EIS studies did not conclude that impacts documented below MTM/VF{mountaintop mining / valley fill} operations cause or contribute to significant degradation of waters of the U.S. (Programmatic Environmental Impact Statement. Corps, EPA et.al. Pg. II. D-9).***

The overwhelming majority of biological impairment listings in the 2010 West Virginia Section 303(d) List do not have associated sources identified and, in no instances, are the specific mining activities evaluated in the MTM/VF EIS identified as source of biological impairment. More importantly, the referenced statement, extracted from thousands of pages of documentation, does not wholly reflect the findings of the MTM/VF EIS. The MTM/VF EIS clearly recognizes biological impairment in certain waters downstream from evaluated mining activities, as evidenced by the following language that is contained within the same paragraph as the referenced statement:

> *Biological conditions in the streams with only valley fills represented a gradient of conditions from poor to very good; streams with valley fills and residences were most impacted. Impacts could include several stressors, such as valley fills, residences, and/or roads.*

The recognition of biological impairment is also evidenced in the

Responses to Comments section of the MTM/VF EIS:

> *Studies do indicate that aquatic communities downstream of surface coal mining operations and valley fills are impaired in some cases. Certain chemical parameters (sulfates, specific conductance, selenium) are sometimes elevated downstream of mining or valley fills. Stream reaches below mining and valley fills may have changes in substrate particle size distribution from increased fine material due to sedimentation. Some macroinvertebrate communities change in terms of diversity, population size, and pollution tolerance. However, the sample size and monitoring periods conducted for the PEIS were not considered sufficient to establish firm cause-and-effect relationships between individual pollutants and the decline in particular macroinvertebrate populations. Impairment could not be correlated with the number of fills, their size, age, or construction method. See Section II.C. Action 5 in the PEIS recognizes the value of continued evaluation of the effects of mountaintop mining operations on stream chemistry and biology.*

In regard to the supplemental studies, the MTM/VF EIS clearly indicates that the opinions and views expressed by the individual authors of referenced studies do not necessarily reflect the position or view of the agencies preparing the EIS. The DEP does not interpret the cited studies as demonstrations of universal biological integrity in streams below evaluated activities and disagrees with the commenter's characterization of the WVSCI. A "shift" in the benthic macroinvertebrate community of a stream can constitute biological impairment pursuant to 47CSR2 – 3.2.i, and the WVSCI (recognized as a "best science method" in the MTM/VF EIS) provides a sound scientific basis for assessment.

A commenter expressed the concern that "in many cases, the specific data relied upon by DWWM is inadequate and/or deficient" stating that "during metric development for the WVSCI, consideration of individual metrics did not include an evaluation of metric variability." The commenter also contends that biological impairment determinations should not be made based upon a single assessment because "no long term data was used to determine the variability and reproducibility of the use of WVSCI to determine stream impairment."

WVSCI variability has been measured and addressed in the listing methodology. Duplicate sampling (two samples collected at the same location and time) has been a routine component of the DEP's biological monitoring program since the initiation of WVSCI implementation. The observed variability forms the basis for a precision estimate that, in turn, creates the "gray zone" concept that is applied in the listing methodology for biological impairment. Streams with WVSCI scores falling below the true impairment threshold of 68 (5th percentile of reference) and above 60.6 (5th percentile of reference minus the precision estimate) are not initially listed but are targeted for re-evaluation. Because a gray zone WVSCI result does not provide sufficient information for classification of aquatic life use attainment, the DEP also does not interpret it as a demonstration of improved biological condition in delisting decision-making.

Temporal variability of WVSCI reference sites has also been evaluated. Multiple biological re-sampling events have been performed at reference stations. The unchanged watershed conditions and consistent WVSCI scores demonstrate acceptable variability and reproducibility of the WVSCI methodology. Conversely, WVSCI temporal variability cannot be effectively assessed in disturbed watersheds without specific knowledge of changing watershed activities that may impact biological condition. The DEP maintains that the WVSCI protocol for assessment of the 47CSR2-3.2.i criterion is scientifically sound and that the arguments presented by the commenter do not support its abandonment.

Certain comments proclaimed that the Division of Water and Waste Management is being disingenuous in its assessment of the biological integrity of state waters "in an apparent effort to inflate the list of impaired streams in West Virginia and needlessly target the mining industry."

The DEP does not agree with the above assertions. The current list reflects the DEP's responsibility under the Clean Water Act to objectively

assess use attainment in West Virginia waters. The biological assessment methodologies associated with the 2010 effort are essentially the same as those used in the preparation of 303(d) lists over the past ten years. In the very limited instances where the source of biological impairment was identified as "mining," source determinations were made through consideration of scientific information generated in TMDL development processes.

A commenter urged the DEP to seek a statutory change that would allow review of 303(d) listing decisions by the Environmental Quality Board and to develop, through rulemaking, reasonable standards for adding or removing water bodies from 303(d) lists. The commenter cited footnote 19 of the West Virginia Supreme Court of Appeals decision Monongahela Power v. Chief, Office of Water Resources, 567 S.E.2d 629, 641 (W.Va. 2002).

In the cited decision, the Supreme Court ruled that a 303(d) list developed by the DEP did not constitute an "order" pursuant to W.Va. Code § 29A-1-2(e) and is not an action that is appealable to the Environmental Quality Board under W.Va. Code § 22-11-21 (1994). The Court found that the DEP-prepared list is essentially a recommendation and has no force and effect until approved by the Administrator of the EPA, which constitutes the final disposition of the matter. The Court also rejected an argument that persons affected by the list are denied due process, finding that they are provided with the requisite notice and right to be heard. The opinion referenced Federal Clean Water Act provisions mandating that States provide public notice and opportunity for public comment on 303(d) lists prior to final submission to the EPA and case law holding that the EPA's decisions concerning 303(d) lists and Total Maximum Daily Loads are reviewable in United States district courts.

In Footnote 19, the Court noted that there is nothing in federal law which prevents authorizing the Environmental Quality Board to review DEP-prepared 303(d) lists prior to their submission to the EPA for approval and respectfully invited the attention of the Legislature to the matter. While the commenter may seek the Legislature's attention, the DEP does not intend to independently do so. As evidenced by this responsiveness summary and those included in past 303(d) lists, the DEP professionally pursues list preparation and carefully considers and addresses public comments. In their approval, the EPA must determine that the DEP properly executed all of its responsibilities under Section 303(d) of the Act, including proper consideration and response to relevant public comments. State methodologies must be consistent with federal expectations for adding and removing water bodies from the list.

Because of the applicability of federal requirements, the draft nature of list preparation by the DEP and the availability of a federal forum for review of the approved final document, the promulgation of new State rules and/or the creation of an additional State administrative review process is not believed necessary.

Recognizing the extended period of time that may elapse between 303(d) listing and TMDL development, a commenter urged the DEP to consider the inequity of more stringent point source effluent limitations that may result from 303(d) listing even though the impairment might only be resolved by increased control of nonpoint sources.

NPDES permitting rules prohibit permit issuance that would cause or contribute to a violation of water quality standards. Identification of impairment, via 303(d) listing or other mechanisms, may necessitate point sources to achieve a water quality criterion without the benefit of a mixing zone. TMDL development may allow targeting of reductions from the primary causative sources. In some TMDLs developed by the DEP, pollutant reductions are prescribed only from nonpoint sources. In other instances both point and nonpoint source reductions are determined necessary to attain criteria. There will always be some lag time between listing and TMDL development. The commenter correctly recognized that the concern is beyond the purview of those developing the 303(d) list. Nonetheless, the concern is noted.

A commenter urged the agency to enhance its written program for stream listing by creating a transparent outline of its historical listing decisions and its current listing proposal. The commenter also urged enhancement of outreach activities to include opportunity for public

review and comment prior to finalizing the proposed list.

The DEP believes that the Section 303(d) listing process already accommodates the requests. Each list prepared by the DEP includes a detailed description of the current decision methodology and supplements that provide transparency for past listing decisions and the current classification of previously listed waters. An extended public notice and comment period is provided and comments are carefully considered and addressed.

General and stream-specific comments requested streams to be removed from the 303(d) list because of the age of the samples and data used for listing. The following streams were requested to be removed because of "old data": Maynard Branch (WVO-2-Q-23), Cutright Run (WVMTB-17), Sawmill Run (WVMTB-20), Short Creek (WVO-90), Jims Branch (WVO-2-Q-18-H) Copley Trace Branch (WVO-2-Q-18-G) Parker Branch (WVO-2-Q-18-D) Indian Creek (WVM-17) Buffalo Creek (WVPSB-5).

Some of the subject biological impairment listings had assessments performed by the DEP in calendar year 2000 and were first listed on the 2002 Section 303(d) list. The ages of the assessments are recognized, but the subject impairments were promptly listed on the next Section 303(d) list after assessment results became available. New data demonstrating non-impaired conditions is not available. The EPA closely evaluates the removal of waters from the 303(d) list without TMDL development. Excluding extenuating circumstances such as a criterion change or a determination that the original listing was made in error, delisting is approvable only where new information demonstrates attainment of water quality standards. TMDL development is preceded by a comprehensive water quality and biological monitoring effort. If new monitoring indicates that a stream is not impaired, then TMDL development will not be initiated and the new data will be used to support delisting of the impairment in the next Section 303(d) List.

Commenters have asked that Dents Run (WVM-23-P), Foxgrape Run (WVMT-26-B), Rockhouse Creek (WVKC-10-T-13), Copley Trace Branch (WVO-2-Q-18-G), Left Fork of Beech Creek (WVKC-10-T-15-A), and Rollem Fork (WVO-2-Q-18-E) be delisted for biological impairment. The requests are based on WVSCI scores for the most monitoring events that fall within the gray zone (60.6 - 68.0).

Streams are neither initially listed nor delisted when their score falls within this zone. Any listed stream which has newer data within the 60.6 to 68.0 range will be retained on the list as there is no evidence that the stream is fully attaining its aquatic life use (i.e. greater than 68.0).

A commenter suggested that the biological impairments of East Fork/Twelvepole Creek (WVO-2-Q) and Kiah Creek (WVO-2-Q-18) be delisted due to the results of recent monitoring believed by the commenter to demonstrate non-impairment.

Both streams were sampled, at numerous locations, in the spring of 2009 by both the DEP and consultants working on behalf of the commenter. The streams were then sampled again by the consultant in the fall of 2009 and again by the DEP in the summer of 2010. It was determined, using all the data available to the DEP, that the streams will not be delisted in their entirety but instead shall be re-segmented.

Reevaluation of East Fork/Twelvepole Creek biological data determined an error in the draft listing for the segment below the dam. No new data is available for this segment. Consistent with the 2008 Section 303(d) list, the impaired length of this segment has been changed to "RM 4.4 to RM 10.5 (East Lynn Dam)". Additionally, the agency confirmed the draft listing for the segment upstream of the lake (RM 35 to headwaters).

Based upon new information, the DEP adjusted the impaired length of Kiah Creek from "RM 3.9 to HW" to "RM 3.9 to RM 11.8". Current biological results indicate non-impaired conditions from RM 3.9 downstream and at the most upstream station (RM 11.8). Results between the aforementioned stations indicate impairment or uncertainty and do not support delisting of this segment.

A commenter provided biological data requesting the delisting of Wet Branch (WVK-61-C).

The DEP evaluated the data and found that it could not be used. The DEP has an accepted period of time in which biological samples are collected. In order for a sample to be considered comparable in must be sampled within the WVSCI index period of April 15th to October 15th. The WVSCI data submitted by the commenter was associated with a sample collected outside of the index period.

A commenter requested that Rollem Fork (WVO-2-Q-18-E), Parker Branch (WVO-2-Q-18-D), Honey Branch (WVO-2-Q-29), Jims Branch (WVO-2-Q-18-H), Copley Trace Branch (WVO-2-Q-18-G) and Maynard Branch (WVO-2-Q-23) be reevaluated as to length of listing and propriety of listing due to existing impoundments and beaver dams.

A field investigation of Rollem Fork in 2008 confirmed the presence of the first instream pond at approximate mile point 0.9. As such, the biological impairment indicated by the benthic macroinvertebrate collection near the mouth of Rollem Fork was considered to be representative of the stream segment between the mouth and mile point 0.9. The impaired reach of Rollem Fork was revised from 1.9 miles to 0.9 miles in the 2008 Section 303(d) list.

In response to the comment, the DEP re-measured Maynard Branch, Jims Branch and Parker Branch and determined impaired lengths indicated in the Draft 2010 303(d) List to be accurate. Copley Trace Branch was re-measured and the listing was revised from “entire length” to “mouth to river mile 1.5.”

The presence of impoundments in a watershed and an implication that the observed biological impairments might be caused by the impoundment rather than by pollutants in the water is taken into consideration when listing a stream. The DEP recognizes that impairments that are not caused by a pollutant need not be included on the Section 303(d) list. In the Integrated Report format, such impairments can be placed in Category 4C rather than Category 5. Applicable the EPA guidance states that waters should be listed in relation to biological assessments unless the state can demonstrate that non-pollutant stressors cause the impairment or that no pollutant(s) causes or contributes to the impairment. While the DEP accepts that the upstream habitat alteration associated with impoundments might negatively impact downstream biological scores, seldom is there sufficient information to properly discern the causative stressors at the time of assessment and listing. Uncertainty of the causative source of biological impairment at the time of assessment, as is most often the case, is not a sufficient reason to exclude the impairment from the 303(d) list. Consistent with the EPA guidance, the DEP lists waters as biologically impaired if available monitoring results fall below the WVSCI threshold. Causative stressors are identified at the front end of the TMDL development process. If the stressor identification process determines that a pollutant does not cause the impairment, then a TMDL will not be developed.

One commenter requested delisting of Frances Creek (WVO-2-Q-18-F), contending the most recent data indicates a non-impaired condition.

The most recent data available (July 2010, WVSCI score = 58.4) indicates Frances Creek is biologically impaired.

One commenter suggested the source for Jims Branch (WVO-2-Q-18-H) biological listing is habitat based not related to upstream mining activities.

The DEP recognizes that there are multiple possible sources of biological impairment and identifies sources as unknown for most initial listings. The source for Jims Branch is currently listed as “unknown” and will be evaluated when the TMDL for this watershed is developed.

A commenter asked the DEP that Wiley Branch (WVO-2-Q-28) be removed from the 2010 Draft 303(d) list for biological impairment based on biological data from Fall 2009 submitted by the commenter.

The impairment was not previously listed and the most current qualifying

biological data (July 2010, WVSCI score = 64.7) falls within the gray zone and does not support a new listing. As such, the proposed listing has been removed.

A commenter requested delisting of biological impairments for Honey Branch (WVO-2-Q-29) and Right Fork/Cub Branch (WVO-2-Q-31-A) based on new data from samples collected in October 2009 and April 2010.

The DEP re-sampled Honey Branch and Right Fork/Cub Branch in July 2010 and resultant WVSCI scores (55.9 and 53.0, respectively) do not support delisting.

A commenter requested delisting of biological impairments for Indian Creek (WVM-17), Dents Run (WVM-23-P) and Sawmill Run (WVMTB-20) citing issues of representativeness of samples.

The DEP reviewed the sample information and determined the samples were comparable per the WVSCI methodology. The listings have been retained.

A commenter asked that Vance Branch (WVO-2-Q-18-C-1) be removed from the Draft list as the entire length of stream had received a Section 404 permit for its filling.

The DEP verified the existence of a permit to fill the stream and determined filling of the stream had taken place. The remaining section of stream does not contain suitable sample area to support the WVSCI protocol, therefore the small remaining portion of Vance Branch has been removed.

One commenter requested that the iron impairment of Indian Creek (WVM-17) be delisted.

The DEP has reviewed Division of Mining and Reclamation trend data for iron in Indian Creek and found one violation out of 51 samples in the past three plus years (2% rate of exceedance). Based on this data, the iron impairment was removed.

A comment was received requesting delisting of the biological impairment for Short Creek (WVO-90), stating the age of data used for listing and the number of samples were insufficient. The commenter also mentioned a more recent biological result (WVSCI score = 60.4 at mile point 3.4). Additionally, the commenter wanted the source of the Short Creek impairment changed from "mining" to "undetermined."

The WVSCI scores observed in 2005 clearly indicate biological impairment from the mouth through mile point 7.6. At that location, the observed WVSCI score of 61.3 falls within the 'gray zone.' As described previously, gray zone scores represent uncertain biological conditions and are not evidence of an acceptable condition. As per the listing methodology, the entire length of the stream will remain listed. The recent biological score of 60.4 does not contradict the assessment.

The 2005 monitoring of Short Creek and its tributaries was a component of pre-TMDL monitoring for the Upper Ohio South Watershed TMDL development project. Within that project, the biological stressor identification process determined ionic stress as a significant stressor of Short Creek. TMDL development for the biological impairment was deferred. Since a TMDL has not been developed for the biological impairment of Short Creek, it must remain on the 303(d) list. The EPA has directed the DEP to consider the results of stressor identification in identifying sources associated with 303(d) listings. In this instance, the sources of ionic stress are active and/or historical mining activities.

A commenter questioned the iron impairment for Paint Creek (WVK-65) based upon trout water criteria.

After consultation with the DNR, the DEP has determined Paint Creek to be a trout water for the section between Burnwell (RM 13.24) and Pax (RM 31.48). This is consistent with the segment identified as trout water in the 2001 Paint Creek TMDL. In the 2010 Draft 303(d) List, the DEP mistakenly identified the section above Pax as trout water and has corrected the listing.

Several commenters submitted data and/or WVSCI scores requesting reevaluation of the biological impairment listings of Pine Creek (WVOG-65-H), Right Fork of Pine Creek (WVOG-65-H-1), Cow Creek (WVOG-65-J), Rockhouse Creek (WVKC-10-T-13), and Left Fork of Beech Creek (WVKC-10-T-15-A).

The DEP requires basic information (i.e. location, methods, etc) be supplied with data in order for it to be qualified and evaluated. These submissions did not contain the necessary information; therefore, the DEP did not accept the data for evaluation.

A commenter requested changing the biological impairment listing for Spruce Fork (WVKC-10-T) from "entire length" to "mouth to river mile 13." The commenter provided a WVSCI score of 67.1 at river mile 13.

A WVSCI score that falls within the gray zone (60.6 to 68.0) does not indicate a non-impaired condition. Also, the submitted data did not meet the necessary qualifications. As such, Spruce Fork will remain on the 303(d) list for its entire length.

List Format Description

The format of the 2010 Section 303(d) list is organized around the Watershed Management Framework. The five hydrologic groups (A-E) of the framework provide the skeleton. Within each hydrologic group, watersheds are arranged alphabetically and impaired waters are sorted by stream code in their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criterion, the affected designated use, the general cause of the impairment (where known), the impaired length (or, by default, the entire length), the planned or last possible timing of TMDL development and whether or not the impairment was on the 2008 list. The cause of impairment is often unknown or uncertain at the time of listing and is so indicated on the list. The scheduling of TMDL development is discussed in detail in the Total Maximum Daily Load Process section. A West Virginia Watershed Management Framework map on page 6 is provided to assist navigation within the list. A key is also provided to aid in the interpretation of presented information.

List Supplements Overview

Seven supplements are provided that contain additional information. The seven supplements are entitled: "Previously Listed Waters – No TMDL Developed," "Previously Listed Waters – TMDL Developed," "Impaired Waters under TMDL Development," "Water Quality Improvements Being Implemented – Below Listing Criteria," "Impaired Waters – No TMDL Needed," "Total Aluminum TMDLs Developed," "Supplemental Table E - Manganese TMDLs" and "New Listings for 2010."

Supplemental Table A - Previously Listed Waters – No TMDL Developed

Previously listed waters from the 2008 list that are not on the 2010 list are included in this supplement if a TMDL has not been developed, and these waters have been reevaluated and determined not to be impaired. Causes for revision of the impairment status include recent water quality data demonstrating an improved water quality condition, revision to the water quality criteria associated with the previous listing, documentation that the water was previously listed in error or a modification of the listing methodology.

Supplemental Table B - Previously Listed Waters - TMDL Developed

TMDLs have been developed for many previously listed waters. TMDL development allows the removal of an impaired water from the 303(d) list. In the suggested format of the Integrated Report, such waters are to be classified in Category 4A and clearly distinguished from Category 5 and the 303(d) list. Waters included in Category 4A have TMDLs developed, but water quality improvements are not yet complete and/or documented. The waters identified in Supplement B will match those of Category 4A of the Integrated Report.

Supplemental Table C - Water Quality Improvements

The goal of TMDLs and stream restoration projects is to bring the stream back to the point where it meets its designated uses and the associated water quality criteria. Supplement C includes a listing of streams with improved water quality due to TMDL implementation or pre-TMDL stream restoration work resulting in delisting. In the Integrated Report, the waters in Supplement C are to be included in Category 1 (meeting all uses), provided that impairments for other uses/pollutants are not evidenced.

Supplemental Table D - Impaired Waters - No TMDL Development Needed

This table lists impaired waters for which either other control mechanisms are in place to control pollutants or the water is not impaired by a pollutant (i.e., flow alterations caused by mining). These are the same waters contained in the Integrated Report's Category 4b and 4c, respectively.

Supplemental Table E - Total Aluminum TMDLs Developed

This table contains a list of previously listed waters for total aluminum TMDL that were developed and established by the EPA. Due to a criteria change from total aluminum to dissolved aluminum, the state placed total aluminum TMDLs onto a separate table from Supplemental Table B.

Supplemental Table E - Manganese TMDLs Developed

Manganese TMDLs identify waters which had TMDLs developed based upon water quality criteria that is no longer effective. After the subject TMDLs were developed, EPA approved revisions to West Virginia water quality standards that restricted the applicability of the manganese criterion to five mile zones upstream of known water supply intakes. The table is included to document the development of the obsolete TMDLs and to distinguish them from the effective TMDLs identified in Supplemental Table B.

Supplemental Table F - New Listings for 2010

This table is a list of impaired waters that were not previously included on the 2008 Section 303(d) list.

WV 2010 Section 303(d) List Key

List Format

Impaired waters are first organized by their hydrologic group pursuant to the West Virginia Watershed Management Framework (i.e. Hydrologic Group A waters are shown first, followed by Hydrologic Group B, etc.). Within each hydrologic group, major watersheds are displayed alphabetically (e.g. within Hydrologic Group B, the **C**oal watershed is displayed first, followed by the **E**lk, and so on.) Within each major watershed, impaired waters are arranged by their stream code.

The following table displays the format of the West Virginia 2010 Section 303(d) List and contains excerpts designed to display various intricacies.

Stream Name	Stream Code	Criteria Affected	Source	Impaired Length (mi)	Reach Description	Projected TMDL Year	2008 List?
Hydrologic Group B							
Elk Watershed – HUC # 05050007							
Elk River	WVKE	Fecal Coliform	Unknown	106.4	Mouth to RM 106.4 (Sutton Lake)	2010	Yes
		Iron	Unknown	106.4	Mouth to RM 106.4 (Sutton Lake)	2010	TMDL Rev.
Laurel Creek	WVKE-37	Fecal Coliform	Unknown	7.6	Entire Length	2010	No
Horner Fork	WVKE-37-C	Fecal Coliform	Unknown	1.5	Entire Length	2010	No
Reed Fork	WVKE-37-C-1	CNA-Biological	Unknown	1.9	Entire Length	2010	Yes
		Fecal Coliform	Unknown	1.9	Entire Length	2010	No

West Virginia's streams are coded under an alphanumeric system. Major rivers have been assigned an alphabetical code that symbolizes their name. For example, the code for the Elk River is "WV**KE**" which symbolizes West Virginia-**K**anawha-**E**lk. Adding a numerical suffix to the major river code codifies tributaries to the mainstems of the major rivers. Suffixes are applied in ascending order from mouth to headwaters. Tributaries of tributaries are codified by alternately adding numerical and alphabetical suffixes, always in ascending order from mouth to headwaters. In the example table, the Laurel Creek (WVKE-**37**) is the 37th tributary of the Elk River (WVKE) and Horner Fork (WVKE-37-**C**) is the third tributary of the Laurel Creek. Reed Fork (WVKE-37-C-**1**) is the first tributary of Horner Fork.

The "Criteria Affected" column identifies the water quality criterion that is not attained in the impaired water. On the list, a separate line is provided for each affected criterion. The "Source" column identifies the general source(s) of the impairment. In most instances, the actual source of impairment is not known at the time of listing. For all waters and impairments, the impaired length is provided, as well as the impaired reach description, in as much detail as possible. If the exact length of impairment is unknown, the entire length of the stream is indicated by default. Sources of impairment and impaired reach descriptions will be confirmed in the TMDL development process.

The "Projected TMDL Year" column indicates the latest year in which the WVDEP plans to develop a TMDL for the impairment. The last column of the list provides information as to whether or not the stream appeared on the West Virginia 2008 Section 303(d) List or is a new listing. (In the example, "TMDL Rev." indicates that DEP is revising an existing TMDL).

Projected TMDL Completion Year	
Hydrologic Group A	2014, 2019, 2024
Hydrologic Group B	2010, 2015, 2020, 2025
Hydrologic Group C	2011, 2016, 2021
Hydrologic Group D	2012, 2017, 2022
Hydrologic Group E	2013, 2018, 2023

Designated Uses

The affected designated uses associated with each listing are not displayed in the tabular format. Instead, the following table and discussion provides information regarding the affected designated use(s) for all criteria exceedances that resulted in the listing of impaired waters.

Criterion	Affected Designated Use			
	Aquatic Life	Contact Recreation	Public Water Supply	All Other uses
Aluminum, dissolved	X			
Chloride	X		X	
Chromium, hexavalent	X			
CNA - Algae		X	X	
CNA - Biological	X			
Dioxin (2,3,7,8 - TCDD)		X	X	X
Fecal Coliform / Bacteria		X	X	
Iron	X		X	
Lead, dissolved	X			
Manganese			X	
Mercury		X	X	
Nitrite	X			
PCBs		X		
pH	X	X	X	X
Selenium	X		X	
Zinc	X			

Abbreviations and Acronyms

The following table defines abbreviations and acronyms used.

AQ	Aquatic Life	**mi**	Miles
CNA	Conditions Not Allowable	**mp**	Mile Point
(dis)	Dissolved	**RM**	River Mile
HW	Headwaters	**TMDL**	Total Maximum Daily Load
HUC	Hydrologic Unit Code	**TMDL Rev.**	Total Maximum Daily Load Revision
(Trout)	Used to signify trout water criterion	**UNT**	Unnamed Tributary

West Virginia 2010 Section 303(d) List

HYDROLOGIC GROUP A

CHEAT WATERSHED - HUC# 05020004

1 Lake 1730 acres 124 streams 561 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Cheat River	WVMC	Iron	Unknown	26.5	Cheat Lake to RM 26.5 (Pringle Run)	2010	TMDL Rev.
Cheat Lake	WVMC-(L1)	PCBs	Unknown	1730.0	Entire length	2019	Yes
UNT/Cheat River RM 1.85	WVMC-0.1	Aluminum (d)	Unknown	1.0	Entire length	2010	Yes
		Iron	Unknown	1.0	Entire length	2010	Yes
		pH	Unknown	1.0	Entire length	2010	Yes
UNT/Cheat River RM 4.07	WVMC-0.5	Aluminum (d)	Unknown	1.0	Entire length	2010	Yes
		Iron	Unknown	1.0	Entire length	2010	TMDL Rev.
		pH	Unknown	1.0	Entire length	2010	TMDL Rev.
UNT/Cheat River RM 7.70	WVMC-2.3	Aluminum (d)	Unknown	1.0	Entire length	2010	Yes
		Iron	Unknown	1.0	Entire length	2010	TMDL Rev.
		pH	Unknown	1.0	Entire length	2010	TMDL Rev.
UNT/Cheat River RM 8.39	WVMC-2.4	Aluminum (d)	Unknown	2.3	Entire length	2010	Yes
		Iron	Unknown	2.3	Entire length	2010	TMDL Rev.
		pH	Unknown	2.3	Entire length	2010	TMDL Rev.
Coles Run	WVMC-2.5	CNA-Biological	Unknown	2.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.0	Entire length	2010	Yes
Birch Hollow	WVMC-2.5-A	Fecal Coliform	Unknown	2.0	Entire length	2010	Yes
Kelly Run	WVMC-2.7	CNA-Biological	Unknown	1.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.8	Entire length	2010	Yes
		Iron	Unknown	1.8	Entire length	2010	Yes
Crammeys Run	WVMC-3	Fecal Coliform	Unknown	1.4	Entire length	2010	Yes
Whites Run	WVMC-4	CNA-Biological	Unknown	2.5	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.5	Entire length	2010	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Maple Run	WVMC-5	Aluminum (d)	Unknown	1.2	Entire length	2010	Yes
		pH	Unknown	1.2	Entire length	2010	Yes
Bull Run	WVMC-11	Aluminum (d)	Unknown	6.2	Entire length	2010	Yes
		CNA-Biological	Unknown	6.2	Entire length	2010	Yes
		Iron	Unknown	6.2	Entire length	2010	TMDL Rev.
		pH	Unknown	6.2	Entire length	2010	TMDL Rev.
UNT/Bull Run RM 1.64	WVMC-11-0.1A	Aluminum (d)	Unknown	1.6	Entire length	2010	Yes
		pH	Unknown	1.6	Entire length	2010	TMDL Rev.
Middle Run	WVMC-11-A	Aluminum (d)	Unknown	1.7	Entire length	2010	Yes
		Iron	Unknown	1.7	Entire length	2010	TMDL Rev.
		pH	Unknown	1.7	Entire length	2010	TMDL Rev.
Mountain Run	WVMC-11-B	Aluminum (d)	Unknown	2.4	Entire length	2010	Yes
		pH	Unknown	2.4	Entire length	2010	TMDL Rev.
Lick Run	WVMC-11-B-1	Aluminum (d)	Unknown	1.6	Entire length	2010	Yes
		Iron	Unknown	1.6	Entire length	2010	TMDL Rev.
		pH	Unknown	1.6	Entire length	2010	TMDL Rev.
UNT/Bull Run RM 3.73	WVMC-11-C	Aluminum (d)	Unknown	1.5	Entire length	2010	Yes
		Iron	Unknown	1.5	Entire length	2010	TMDL Rev.
		pH	Unknown	1.5	Entire length	2010	TMDL Rev.
Left Fork Bull Run	WVMC-11-D	pH	Unknown	2.7	Entire length	2010	Yes
Right Fork Bull Run	WVMC-11-E	Aluminum (d)	Unknown	1.8	Entire length	2010	Yes
		CNA-Biological	Unknown	1.8	Entire length	2010	Yes
		pH	Unknown	1.8	Entire length	2010	TMDL Rev.
Big Sandy Creek	WVMC-12	CNA-Biological	Unknown	19.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	19.0	Entire length	2010	Yes
		Iron	Unknown	19.0	Entire length	2010	Yes
		pH	Unknown	19.0	Entire length	2010	TMDL Rev.

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Big Sandy Creek RM 2.91	WVMC-12-0.2A	Aluminum (d)	Unknown	1.4	Entire length	2010	Yes
		Iron	Unknown	1.4	Entire length	2010	TMDL Rev.
		pH	Unknown	1.4	Entire length	2010	TMDL Rev.
Sovern Run	WVMC-12-0.5A	Aluminum (d)	Unknown	4.7	Entire length	2010	Yes
		CNA-Biological	Unknown	4.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	4.7	Entire length	2010	Yes
		pH	Unknown	4.7	Entire length	2010	TMDL Rev.
Parker Run	WVMC-12-0.7A	Fecal Coliform	Unknown	2.0	Entire length	2010	Yes
		Iron	Unknown	2.0	Entire length	2010	Yes
Little Laurel Run	WVMC-12-A-1	Aluminum (d) (trout)	Unknown	4.2	Entire length	2010	Yes
		pH	Unknown	4.2	Entire length	2010	Yes
Little Sandy Creek	WVMC-12-B	Fecal Coliform	Unknown	14.0	Entire length	2010	Yes
		Iron (trout) AQ	Unknown	14.0	Entire length	2010	TMDL Rev.
Webster Run	WVMC-12-B-0.5	Fecal Coliform	Unknown	3.2	Entire length	2010	Yes
UNT/Webster Run RM 1.25	WVMC-12-B-0.5-B	Aluminum (d)	Unknown	1.6	Entire length	2010	Yes
		CNA-Biological	Unknown	1.6	Entire length	2010	Yes
		pH	Unknown	1.6	Entire length	2010	Yes
UNT/Little Sandy Creek RM 2.80	WVMC-12-B-0.6	Fecal Coliform	Unknown	1.0	Entire length	2010	Yes
UNT/Little Sandy Creek RM 5.04	WVMC-12-B-0.8	Fecal Coliform	Unknown	1.0	Entire length	2010	Yes
Beaver Creek	WVMC-12-B-1	Aluminum (d) (trout)	Unknown	7.4	Entire length	2010	No
		Iron (trout) AQ	Unknown	7.4	Entire length	2010	No
		pH	Unknown	7.4	Entire length	2010	TMDL Rev.
Glade Run	WVMC-12-B-1-A	Fecal Coliform	Unknown	2.8	Entire length	2010	Yes
UNT/Beaver Creek RM 1.25	WVMC-12-B-1-B	pH	Unknown	0.8	Entire length	2010	Yes
UNT/Beaver Creek RM 1.68	WVMC-12-B-1-C	Aluminum (d)	Unknown	2.0	Entire length	2010	Yes
		pH	Unknown	2.0	Entire length	2010	TMDL Rev.
Barnes Run	WVMC-12-B-2	Fecal Coliform	Unknown	4.8	Entire length	2010	Yes
Hog Run	WVMC-12-B-3	Iron (trout) AQ	Unknown	4.6	Entire length	2010	TMDL Rev.

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Elk Run	WVMC-12-B-4	pH	Unknown	3.2	Entire length	2010	Yes
Piney Run	WVMC-12-B-4.5	Iron (trout) AQ, HH	Unknown	1.7	Entire length	2010	Yes
		pH	Unknown	1.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.7	Entire length	2010	Yes
Cherry Run	WVMC-12-B-5	Aluminum (d) (trout)	Unknown	3.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.0	Entire length	2010	Yes
		Iron (trout) AQ, HH	Unknown	3.0	Entire length	2010	TMDL Rev.
UNT/Cherry Run RM 1.96	WVMC-12-B-5-C	Iron	Unknown	2.0	Entire length	2010	Yes
		pH	Unknown	2.0	Entire length	2010	Yes
Mill Run	WVMC-12-B-6	Aluminum (d) (trout)	Unknown	3.9	Entire length	2010	Yes
		Iron (trout) AQ	Unknown	3.9	Entire length	2010	Yes
Hazel Run	WVMC-12-C	Aluminum (d) (trout)	Unknown	5.6	Entire length	2010	Yes
		CNA-Biological	Unknown	5.6	Entire length	2010	Yes
		Fecal Coliform	Unknown	5.6	Entire length	2010	Yes
		Iron (trout) AQ, HH	Unknown	5.6	Entire length	2010	TMDL Rev.
		pH	Unknown	5.6	Entire length	2010	TMDL Rev.
Glade Run	WVMC-12-D	Fecal Coliform	Unknown	4.0	Entire length	2010	Yes
		Iron	Unknown	4.0	Entire length	2010	Yes
UNT/Big Sandy Creek RM 10.23	WVMC-12-D.4	Fecal Coliform	Unknown	1.0	Entire length	2010	Yes
Glade Run	WVMC-12-E	Fecal Coliform	Unknown	6.6	Entire length	2010	Yes
		Iron	Unknown	6.6	Entire length	2010	Yes
Conner Run	WVMC-13.5	Aluminum (d)	Unknown	2.9	Entire length	2010	Yes
		Iron	Unknown	2.9	Entire length	2010	TMDL Rev.
		pH	Unknown	2.9	Entire length	2010	TMDL Rev.
Greens Run	WVMC-16	Aluminum (d)	Unknown	8.2	Entire length	2010	Yes
		CNA-Biological	Unknown	8.2	Entire length	2010	Yes
		Iron	Unknown	8.2	Entire length	2010	TMDL Rev.
		pH	Unknown	8.2	Entire length	2010	TMDL Rev.

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
South Fork/Greens Run	WVMC-16-A	Aluminum (d)	Unknown	4.3	Entire length	2010	Yes
		CNA-Biological	Unknown	4.3	Entire length	2010	Yes
		Iron	Unknown	4.3	Entire length	2010	TMDL Rev.
		pH	Unknown	4.3	Entire length	2010	Yes
UNT/South Fork RM 0.63/Greens Run	WVMC-16-A-1	Aluminum (d)	Unknown	2.4	Entire length	2010	Yes
		CNA-Biological	Unknown	2.4	Entire length	2010	Yes
		Iron	Unknown	2.4	Entire length	2010	TMDL Rev.
		pH	Unknown	2.4	Entire length	2010	TMDL Rev.
UNT/Greens Run RM 6.88	WVMC-16-E	CNA-Biological	Unknown	1.0	Entire length	2024	No
Muddy Creek	WVMC-17	Aluminum (d)	Unknown	3.4	Mouth to RM 3.4	2010	Yes
		Aluminum (d) (trout)	Unknown	12.2	RM 3.4 to HW	2010	Yes
		CNA-Biological	Unknown	9.9	Mouth to RM 9.9	2010	Yes
		Fecal Coliform	Unknown	15.6	Entire length	2010	Yes
		Iron	Unknown	3.4	Mouth to RM 3.4	2010	TMDL Rev.
		Iron (trout) AQ, HH	Unknown	12.2	RM 3.4 to HW	2010	TMDL Rev.
		pH	Unknown	15.6	Entire length	2010	TMDL Rev.
Sypolt Run	WVMC-17-0.5A	Iron	Unknown	1.6	Entire length	2010	Yes
		pH	Unknown	1.6	Entire length	2010	Yes
Crab Orchard Run	WVMC-17-0.7A	Iron	Unknown	3.5	Entire length	2010	Yes
Martin Creek	WVMC-17-A	Aluminum (d)	Unknown	2.6	Entire length	2010	Yes
		CNA-Biological	Unknown	2.6	Entire length	2010	Yes
		Iron	Unknown	2.6	Entire length	2010	TMDL Rev.
		pH	Unknown	2.6	Entire length	2010	TMDL Rev.

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Fickey Run	WVMC-17-A-0.5	Aluminum (d)	Unknown	2.8	Entire length	2010	Yes
		CNA-Biological	Unknown	2.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.8	Entire length	2010	Yes
		Iron	Unknown	2.8	Entire length	2010	TMDL Rev.
		pH	Unknown	2.8	Entire length	2010	TMDL Rev.
Glade Run	WVMC-17-A-1	Aluminum (d)	Unknown	3.6	Entire length	2010	Yes
		CNA-Biological	Unknown	3.6	Entire length	2010	Yes
		Iron	Unknown	3.6	Entire length	2010	TMDL Rev.
		pH	Unknown	3.6	Entire length	2010	TMDL Rev.
UNT/Glade Run RM 1.06	WVMC-17-A-1-A	Aluminum (d)	Unknown	1.0	Entire length	2010	Yes
		Iron	Unknown	1.0	Entire length	2010	TMDL Rev.
		pH	Unknown	1.0	Entire length	2010	TMDL Rev.
UNT/Glade Run RM 1.36	WVMC-17-A-1-B	Aluminum (d)	Unknown	1.2	Entire length	2010	Yes
		Iron	Unknown	1.2	Entire length	2010	TMDL Rev.
		pH	Unknown	1.2	Entire length	2010	TMDL Rev.
UNT/Muddy Creek RM 9.80	WVMC-17-A.8	Fecal Coliform	Unknown	0.8	Entire length	2010	Yes
		Iron	Unknown	0.8	Entire length	2010	Yes
UNT/UNT RM 0.12/Muddy Creek RM 9.80	WVMC-17-A.8-1	Aluminum (d)	Unknown	2.3	Entire length	2010	Yes
		pH	Unknown	2.3	Entire length	2010	Yes
Jump Rock Run	WVMC-17-B	Aluminum (d) (trout)	Unknown	2.0	Entire length	2010	Yes
		Iron (trout) AQ	Unknown	2.0	Entire length	2010	Yes
		pH	Unknown	2.0	Entire length	2010	Yes
Sugarcamp Run	WVMC-17-C	Aluminum (d) (trout)	Unknown	2.0	Entire length	2010	Yes
		pH	Unknown	2.0	Entire length	2010	Yes
Roaring Creek	WVMC-18	Aluminum (d) (trout)	Unknown	4.8	RM 4.8 (Lick Creek) to HW	2010	Yes
UNT/Roaring Creek RM 0.34	WVMC-18-0.1A	Fecal Coliform	Unknown	1.4	Entire length	2010	Yes
Lick Run	WVMC-18-A	pH	Unknown	3.0	Entire length	2010	Yes

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Little Lick Run	WVMC-18-A-1	Fecal Coliform	Unknown	1.7	Entire length	2010	Yes
UNT/Ragtavern Run RM 0.81	WVMC-20-A-1	Fecal Coliform	Unknown	3.2	Entire length	2010	Yes
Buffalo Run	WVMC-22	Aluminum (d)	Unknown	3.4	Entire length	2010	Yes
		pH	Unknown	3.4	Entire length	2010	Yes
Morgan Run	WVMC-23	Aluminum (d)	Unknown	4.6	Entire length	2010	Yes
		CNA-Biological	Unknown	4.6	Entire length	2010	Yes
		Iron	Unknown	4.6	Entire length	2010	TMDL Rev.
		pH	Unknown	4.6	Entire length	2010	TMDL Rev.
UNT/Morgan Run RM 1.03	WVMC-23-0.2A	CNA-Biological	Unknown	2.4	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.4	Entire length	2010	Yes
		Iron	Unknown	2.4	Entire length	2010	TMDL Rev.
UNT/UNT RM 0.34/Morgan Run RM 1.03	WVMC-23-0.2A-1	Fecal Coliform	Unknown	1.0	Entire length	2010	Yes
Church Creek	WVMC-23-A	Aluminum (d)	Unknown	4.0	Entire length	2010	Yes
		CNA-Biological	Unknown	4.0	Entire length	2010	Yes
		Iron	Unknown	4.0	Entire length	2010	TMDL Rev.
		pH	Unknown	4.0	Entire length	2010	TMDL Rev.
UNT/Church Creek RM 1.26	WVMC-23-A-1	Aluminum (d)	Unknown	1.8	Entire length	2010	Yes
		Iron	Unknown	1.8	Entire length	2010	TMDL Rev.
		pH	Unknown	1.8	Entire length	2010	TMDL Rev.
UNT/UNT RM 0.12/Church Creek RM 1.26	WVMC-23-A-1-A	Aluminum (d)	Unknown	1.0	Entire length	2010	Yes
		Iron	Unknown	1.0	Entire length	2010	Yes
		pH	Unknown	1.0	Entire length	2010	Yes

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Heather Run	WVMC-24	Aluminum (d)	Unknown	3.4	Entire length	2010	Yes
		CNA-Biological	Unknown	3.4	Entire length	2010	Yes
		Iron	Unknown	3.4	Entire length	2010	TMDL Rev.
		Manganese	Unknown	3.4	Entire length	2010	TMDL Rev.
		pH	Unknown	3.4	Entire length	2010	TMDL Rev.
UNT/Heather Run RM 1.47	WVMC-24-A	Fecal Coliform	Unknown	1.0	Entire length	2010	Yes
Lick Run	WVMC-25	Aluminum (d)	Unknown	4.0	Entire length	2010	Yes
		CNA-Biological	Unknown	4.0	Entire length	2010	Yes
		Iron	Unknown	4.0	Entire length	2010	TMDL Rev.
		Manganese	Unknown	4.0	Entire length	2010	TMDL Rev.
		pH	Unknown	4.0	Entire length	2010	TMDL Rev.
UNT/Lick Run RM 1.04	WVMC-25-A	Aluminum (d)	Unknown	1.0	Entire length	2010	Yes
		Iron	Unknown	1.0	Entire length	2010	Yes
		Manganese	Unknown	1.0	Entire length	2010	Yes
		pH	Unknown	1.0	Entire length	2010	Yes
Joes Run	WVMC-26	Aluminum (d)	Unknown	2.8	Entire length	2010	Yes
		CNA-Biological	Unknown	2.8	Entire length	2010	Yes
		Manganese	Unknown	2.8	Entire length	2010	TMDL Rev.
		pH	Unknown	2.8	Entire length	2010	Yes
Pringle Run	WVMC-27	Aluminum (d)	Unknown	4.7	Entire length	2010	Yes
		CNA-Biological	Unknown	4.7	Entire length	2010	Yes
		Iron	Unknown	4.7	Entire length	2010	TMDL Rev.
		Manganese	Unknown	4.7	Entire length	2010	TMDL Rev.
		pH	Unknown	4.7	Entire length	2010	TMDL Rev.
UNT/Pringle Run RM 3.17	WVMC-27-C	Aluminum (d)	Unknown	1.9	Entire length	2010	Yes
		Iron	Unknown	1.9	Entire length	2010	Yes
		pH	Unknown	1.9	Entire length	2010	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Pringle Run RM 3.33	WVMC-27-D	Aluminum (d)	Unknown	1.4	Entire length	2010	Yes
		Iron	Unknown	1.4	Entire length	2010	Yes
		pH	Unknown	1.4	Entire length	2010	Yes
UNT/Pringle Run RM 3.60	WVMC-27-E	Aluminum (d)	Unknown	1.6	Entire length	2010	Yes
		Iron	Unknown	1.6	Entire length	2010	TMDL Rev.
		pH	Unknown	1.6	Entire length	2010	TMDL Rev.
Buckhorn Run	WVMC-31	pH	Unknown	1.4	Entire length	2010	Yes
Spruce Run	WVMC-32-B	Iron (trout) AQ	Unknown	6.7	Entire length	2010	Yes
Bucklick Run	WVMC-32-E	Fecal Coliform	Unknown	3.4	Entire length	2010	Yes
Birchroot Run	WVMC-33-C	Fecal Coliform	Unknown	1.8	Entire length	2010	Yes
Shavers Fork	WVMCS	pH	Unknown	28.0	RM 40.6 (Bemis) to RM 68.6	2014	Yes
		PCBs	Unknown	96.9	Entire length	2019	Yes
Smoky Hollow	WVMCS-0.5	CNA-Biological	Unknown	1.8	Entire length	2014	Yes
McGee Run	WVMCS-39	pH	Unknown	2.0	Entire length	2014	Yes
Yokum Run	WVMCS-40	pH	Unknown	2.6	Entire length	2014	Yes
Crouch Run	WVMCS-41	pH	Unknown	2.8	Entire length	2014	Yes
Whitmeadow Run	WVMCS-44	pH	Unknown	2.5	Entire length	2014	Yes
Stonecoal Run	WVMCS-45	pH	Unknown	2.6	Entire length	2014	Yes
Fish Hatchery Run	WVMCS-48	pH	Unknown	2.8	Entire length	2014	Yes
First Fork	WVMCS-50	pH	Unknown	5.4	Entire length	2014	Yes
Buck Run	WVMCS-52	pH	Unknown	1.0	Entire length	2014	Yes
Second Fork	WVMCS-54	pH	Unknown	4.4	Entire length	2019	Yes
Blackwater River	WVMC-60-D	Aluminum (d) (trout)	Unknown	34.4	Entire length	2010	Yes
		Iron (trout) AQ	Unknown	34.4	Mouth to RM 11.0	2010	TMDL Rev.
Big Run	WVMC-60-D-1	pH	Unknown	4.0	Entire length	2010	Yes
Tub Run	WVMC-60-D-2	Aluminum (d)	Unknown	2.8	Entire length	2010	Yes
		pH	Unknown	2.8	Entire length	2010	TMDL Rev.
Lindy Run	WVMC-60-D-2.5	pH	Unknown	2.0	Entire length	2010	Yes

2010 Section 303(d) List

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Finley Run	WVMC-60-D-2.7	Aluminum (d)	Unknown	0.8	Entire length	2010	Yes
		Iron	Unknown	0.8	Entire length	2010	TMDL Rev.
		pH	Unknown	0.8	Entire length	2010	TMDL Rev.
North Fork/Blackwater River	WVMC-60-D-3	Aluminum (d)	Unknown	8.0	Entire length	2010	Yes
		Iron	Unknown	8.0	Entire length	2010	TMDL Rev.
		pH	Unknown	8.0	Entire length	2010	TMDL Rev.
Long Run	WVMC-60-D-3-A	Aluminum (d)	Unknown	3.6	Entire length	2010	Yes
		CNA-Biological	Unknown	3.6	Entire length	2010	Yes
		Iron	Unknown	3.6	Entire length	2010	TMDL Rev.
		pH	Unknown	3.6	Entire length	2010	TMDL Rev.
Middle Run	WVMC-60-D-3-B	Fecal Coliform	Unknown	1.8	Entire length	2010	Yes
		pH	Unknown	1.8	Entire length	2010	TMDL Rev.
Snyder Run	WVMC-60-D-3-C	pH	Unknown	2.8	Entire length	2010	TMDL Rev.
Sand Run	WVMC-60-D-3-E	Aluminum (d) (trout)	Unknown	2.2	Entire length	2010	Yes
		CNA-Biological	Unknown	2.2	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.2	Entire length	2010	Yes
		Iron (trout) AQ, HH	Unknown	2.2	Entire length	2010	Yes
Beaver Creek	WVMC-60-D-5	pH	Unknown	2.0	Entire length	2010	TMDL Rev.
Hawkins Run	WVMC-60-D-5-C	Aluminum (d)	Unknown	2.0	Entire length	2010	Yes
		pH	Unknown	2.0	Entire length	2010	TMDL Rev.
UNT/Beaver Creek RM 8.81	WVMC-60-D-5-E	pH	Unknown	1.0	Entire length	2010	Yes
UNT/Beaver Creek RM 11.36	WVMC-60-D-5-G	Aluminum (d) (trout)	Unknown	1.0	Entire length	2010	Yes
		Iron (trout) AQ	Unknown	1.0	Entire length	2010	Yes
		pH	Unknown	1.0	Entire length	2010	Yes
UNT/Beaver Creek RM 11.91	WVMC-60-D-5-H	CNA-Biological	Unknown	2.1	Entire length	2024	No
		pH	Unknown	2.1	Entire length	2010	Yes
Yellow Creek	WVMC-60-D-7	CNA-Biological	Unknown	3.0	Entire length	2014	Yes
Freeland Run	WVMC-60-D-12	CNA-Biological	Unknown	1.8	Entire length	2019	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Laurel Run/Dry Fork	WVMC-60-E	pH	Unknown	3.6	Entire length	2014	Yes
Otter Creek	WVMC-60-F	pH	Unknown	12.8	Entire length	2019	Yes
Coal Run	WVMC-60-F-1	pH	Unknown	2.0	Entire length	2019	Yes
Yellow Creek	WVMC-60-F-7	pH	Unknown	2.6	Entire length	2019	Yes
South Fork/Red Run	WVMC-60-G-2	pH	Unknown	1.6	Entire length	2019	Yes
Red Creek	WVMC-60-O	pH	Unknown	19.8	Entire length	2014	Yes
Gandy Run	WVMC-60-O-3	pH	Unknown	2.3	Entire length	2014	Yes
South Fork/Red Creek	WVMC-60-O-4	pH	Unknown	6.0	Entire length	2014	Yes
Stonecoal Run	WVMC-60-O-6	pH	Unknown	2.2	Entire length	2019	Yes
Tory Camp Run	WVMC-60-R	CNA-Biological	Unknown	2.6	Entire length	2014	Yes

SHENANDOAH (HARDY) WATERSHED - HUC# 02070006

2 stream 6 miles

Capon Run	WVSNF-1	CNA-Biological	Unknown	2.7	Entire length	2019	Yes
Crab Run	WVSNF-2	CNA-Biological	Unknown	3.2	Entire length	2019	Yes

SOUTH BRANCH POTOMAC WATERSHED - HUC# 02070001

27 streams 261 miles

South Branch Potomac River	WVPSB	Fecal Coliform	Unknown	40.7	RM 14.2 (Springfield) to RM 54.9 (Old Fields)	2014	Yes
		PCBs	Unknown	127.5	Mouth to RM 127.5 (state line)	2019	Yes
UNT/South Branch Potomac River RM 10.37	WVPSB-1.65	CNA-Biological	Unknown	2.0	Entire length	2024	No
UNT/South Branch Potomac River RM 21.86	WVPSB-1.9	CNA-Biological	Unknown	3.6	Entire length	2014	Yes
Buffalo Creek	WVPSB-5	CNA-Biological	Unknown	3.6	Entire length	2014	Yes
Dumpling Run	WVPSB-9-B	CNA-Biological	Unknown	2.6	Entire length	2014	Yes
Mayhew Run	WVPSB-9-B-2	CNA-Biological	Unknown	1.1	Entire length	2014	Yes
Anderson Run	WVPSB-18	CNA-Biological	Unknown	4.9	Entire length	2014	Yes
Mudlick Run	WVPSB-18-A	CNA-Biological	Unknown	8.4	Entire Length	2014	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Mudlick Run RM 2.88	WVPSB-18-A-0.8	CNA-Biological	Unknown	1.0	Entire length	2019	Yes
UNT/South Branch Potomac River RM 51.62	WVPSB-18.2	pH	Unknown	3.0	Entire length	2019	Yes
Dumpling Run	WVPSB-20-A	CNA-Biological	Unknown	6.6	Entire length	2019	Yes
Dumpling Run	WVPSB-21-F	CNA-Biological	Unknown	1.5	Mouth to RM 1.5	2014	Yes
UNT/South Branch Potomac River RM 40.44	WVPSB-21-T	CNA-Biological	Unknown	2.6	Entire length	2014	Yes
Hawes Run	WVPSB-21-X	CNA-Biological	Unknown	4.2	Mouth to RM 4.2	2014	Yes
Miller Run	WVPSB-21-AA	CNA-Biological	Unknown	6.5	Entire length	2014	Yes
UNT/South Branch Potomac River RM 59.19	WVPSB-21.5	CNA-Biological	Unknown	6.1	Entire length	2019	Yes
North Mill Creek	WVPSB-25-B	CNA-Biological	Unknown	13.2	Entire length	2019	Yes
Robinson Run	WVPSB-26-A	CNA-Biological	Unknown	5.4	Entire length	2019	Yes
South Fork/Lunice Creek	WVPSB-26-D	CNA-Biological	Unknown	10.3	Entire length	2014	Yes
Powers Hollow	WVPSB-28-0.2A	CNA-Biological	Unknown	2.7	Entire length	2014	Yes
Jordan Run	WVPSB-28-A	CNA-Biological	Unknown	5.9	Entire length	2014	Yes
Mill Creek	WVPSB-28-M	CNA-Biological	Unknown	3.4	Entire length	2014	Yes
Judy Run	WVPSB-28-U	CNA-Biological	Unknown	2.1	Entire length	2014	Yes
Reeds Creek	WVPSB-33	CNA-Biological	Unknown	13.8	Entire length	2019	Yes
Deer Run	WVPSB-35	CNA-Biological	Unknown	9.5	Entire length	2019	Yes
Smith Creek	WVPSB-46	CNA-Biological	Unknown	4.7	Mouth to RM 4.7	2014	Yes
East Dry Run	WVPSB-53	CNA-Biological	Unknown	4.0	Entire length	2014	Yes

UPPER KANAWHA WATERSHED - HUC# 05050006

35 streams 163 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Kanawha River (Upper)	WVK-up	PCBs	Unknown	48.0	RM 57.9 (confluence with Elk River) to HW	2019	Yes
Venable Branch (Mission Hollow)	WVK-46	CNA-Biological	Unknown	2.3	Entire length	2014	Yes
Lower Donnally Branch	WVK-48	CNA-Biological	Unknown	2.0	Entire length	2019	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Pointlick Fork	WVK-49-F	CNA-Biological	Mining	3.7	Entire length	2013	Yes
Rattlesnake Hollow	WVK-49-I	CNA-Biological	Mining	2.0	Entire length	2013	Yes
Big Ninemile Fork	WVK-49-N	CNA-Biological	Unknown	1.8	Entire length	2014	Yes
Georges Creek	WVK-50	CNA-Biological	Unknown	2.8	Entire length	2014	Yes
New West Hollow	WVK-58-B.8-1	CNA-Biological	Unknown	1.2	Entire length	2024	No
Wet Branch	WVK-61-C	CNA-Biological	Mining	3.3	Entire length	2013	Yes
Coal Fork	WVK-61-H	CNA-Biological	Mining	5.8	Entire length	2013	Yes
Toms Fork	WVK-61-K	CNA-Biological	Unknown	1.8	Entire length	2024	No
Tenmile Fork	WVK-61-L	Selenium AQ	Unknown	6.0	Entire length	2019	Yes
UNT/Tenmile Fork RM 1.22	WVK-61-L-0.5	CNA-Biological	Unknown	1.4	Entire length	2014	Yes
UNT/Tenmile Fork RM 3.98	WVK-61-L-4	Selenium AQ	Unknown	1.0	Entire length	2019	Yes
Kellys Creek	WVK-64	CNA-Biological	Unknown	6.5	Entire length	2019	Yes
Horsemill Branch	WVK-64-A	CNA-Biological	Unknown	2.1	Entire length	2014	Yes
		Manganese	Unknown	2.1	Entire length	2014	Yes
		pH	Unknown	2.1	Entire length	2014	Yes
Sugarcamp Branch	WVK-64-C	CNA-Biological	Unknown	1.5	Entire length	2019	Yes
Bufflick Branch	WVK-64-D	CNA-Biological	Unknown	2.6	Entire length	2019	Yes
Hurricane Fork	WVK-64-K	CNA-Biological	Unknown	3.1	Entire length	2019	Yes
Paint Creek	WVK-65	Iron (trout) AQ	Unknown	18.6	RM 13.24 to RM 31.48	2019	Yes
Banner Hollow	WVK-65-D	CNA-Biological	Unknown	3.0	Entire length	2019	Yes
Sycamore Branch	WVK-65-L	CNA-Biological	Unknown	3.2	Entire length	2014	Yes
Long Branch	WVK-65-M-1	Aluminum (d)	Unknown	4.1	Entire length	2024	No
Cedar Creek	WVK-65-Q	CNA-Biological	Unknown	1.2	Entire length	2019	Yes
Bishop Fork	WVK-65-X	CNA-Biological	Unknown	1.7	Entire length	2014	Yes
Mossy Creek	WVK-65-Y	CNA-Biological	Unknown	5.8	Entire length	2019	Yes
North Sand Branch	WVK-65-HH-1	CNA-Biological	Unknown	3.5	Entire length	2019	Yes
Maple Fork	WVK-65-HH-1-A	CNA-Biological	Unknown	2.9	Entire length	2014	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Hughes Creek	WVK-66	CNA-Biological	Unknown	7.0	Entire length	2014	Yes
		Selenium AQ	Unknown	7.0	Entire length	2019	Yes
Martin Hollow	WVK-66-B.5	CNA-Biological	Unknown	1.2	Entire length	2019	Yes
Barn Hollow	WVK-66-B.6	CNA-Biological	Unknown	0.7	Entire length	2019	Yes
Sixmile Hollow	WVK-66-D	Selenium AQ	Unknown	1.5	Entire length	2019	Yes
Smithers Creek	WVK-72	CNA-Biological	Unknown	5.6	Mouth to RM 5.6	2014	Yes
		Selenium AQ	Unknown	5.6	Mouth to RM 5.6	2019	Yes
Bullpush Fork	WVK-72-B	CNA-Biological	Unknown	2.4	Entire length	2014	Yes
Dempsey Branch	WVK-76-C-1	CNA-Biological	Unknown	2.7	Entire length	2014	Yes

UPPER OHIO NORTH WATERSHED - HUC# 05030101

6 streams 43 miles

Ohio River (Upper North)	WVO-un	Dioxin	Unknown	31.4	MP 71.4 to MP 40 (PA line) (Entire length)	2015	Yes
		Bacteria	Unknown	31.4	MP 71.4 to MP 40 (PA line) (Entire length)	2012	Yes
		Iron	Unknown	31.4	MP 71.4 to MP 40 (PA line) (Entire length)	2018	Yes
Mahan Run	WVO-96	CNA-Biological	Unknown	2.8	Entire length	2014	Yes
Holbert Run	WVO-99	CNA-Biological	Unknown	2.8	Entire length	2014	Yes
Muchmores Run (Laurel Hollow)	WVO-105	CNA-Biological	Unknown	2.1	Entire length	2014	Yes
Middle Run	WVO-107	CNA-Biological	Unknown	2.0	Entire length	2014	Yes
Marks Run	WVO-108	CNA-Biological	Unknown	1.7	Entire length	2014	Yes

YOUGHIOGHENY WATERSHED - HUC# 05020006

1 streams 6 miles

Youghiogheny River	WVMY	CNA-Biological	Unknown	6.2	Entire length	2019	Yes

HYDROLOGIC GROUP B

COAL WATERSHED - HUC# 05050009

18 streams 96 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Fuquay Creek	WVKC-8	CNA-Biological	Unknown	5.4	Entire length	2025	No
Ely Fork	WVKC-10-E-2	CNA-Biological	Unknown	3.6	Entire length	2020	Yes
Slippery Gut Branch	WVKC-10-M	CNA-Biological	Unknown	1.9	Entire length	2020	Yes
Spruce Fork	WVKC-10-T	CNA-Biological	Unknown	31.0	Entire length	2025	No
Rockhouse Creek	WVKC-10-T-13	CNA-Biological	Mining	3.0	Entire length	2013	Yes
Left Fork/Beech Creek	WVKC-10-T-15-A	CNA-Biological	Mining	2.4	Entire length	2013	Yes
Trace Fork	WVKC-10-U-12-A	CNA-Biological	Unknown	0.9	Entire length	2020	Yes
James Branch	WVKC-10-U-16	CNA-Biological	Mining	4.2	Entire length	2013	Yes
Brier Creek	WVKC-13	CNA-Biological	Unknown	8.4	Entire length	2020	Yes
Hopkins Fork	WVKC-31-B	CNA-Biological	Unknown	11.3	Entire length	2020	Yes
Seng Creek	WVKC-42	CNA-Biological	Mining	5.9	Entire length	2013	Yes
Ellis Creek	WVKC-46-B	CNA-Biological	Mining	1.2	Mouth to RM 1.2	2013	Yes
Rock Creek	WVKC-46-I	CNA-Biological	Unknown	5.2	Entire length	2020	Yes
Spanker Branch	WVKC-46-M	CNA-Biological	Unknown	2.0	Entire length	2020	Yes
Rockhouse Creek	WVKC-47-A	Selenium AQ	Unknown	3.3	Entire length	2020	Yes
Raines Fork	WVKC-47-E-4	CNA-Biological	Unknown	1.1	Entire length	2015	Yes
Toney Fork	WVKC-47-L	CNA-Biological	Mining	2.4	Entire length	2013	Yes
Buffalo Fork	WVKC-47-L-1	CNA-Biological	Mining	2.5	Entire length	2013	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
ELK WATERSHED - HUC# 05050007							*102 streams 640 miles*
Elk River	WVKE	Fecal Coliform	Unknown	102.5	Mouth to RM 102.5 (Sutton Dam)	2010	Yes
		Iron	Unknown	102.5	Mouth to RM 102.5 (Sutton Dam)	2010	TMDL Rev.
Magazine Branch	WVKE-1	Fecal Coliform	Unknown	2.3	Entire length	2010	No
		Iron	Unknown	2.3	Entire length	2010	No
Elk Twomile Creek	WVKE-2	Fecal Coliform	Unknown	7.6	Entire length	2010	No
Valley Grove Branch	WVKE-2-B	Fecal Coliform	Unknown	2.3	Entire length	2010	No
Green Bottom	WVKE-2-E	CNA-Biological	Unknown	0.9	Entire length	2010	Yes
		Fecal Coliform	Unknown	0.9	Entire length	2010	No
Newhouse Branch	WVKE-3	CNA-Biological	Unknown	2.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.0	Entire length	2010	No
Coonskin Branch	WVKE-4	CNA-Biological	Unknown	1.1	Entire length	2010	Yes
Coopers Creek	WVKE-7	Fecal Coliform	Unknown	6.5	Entire length	2010	No
Mile Fork	WVKE-7-A	Fecal Coliform	Unknown	2.7	Entire length	2010	No
		Iron	Unknown	2.7	Entire length	2010	No
Kaufman Branch	WVKE-7-E	CNA-Biological	Unknown	1.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.0	Entire length	2010	No
		Iron	Unknown	1.0	Entire length	2010	No
Indian Creek	WVKE-8	CNA-Biological	Unknown	6.2	Entire length	2010	No
Little Sandy Creek	WVKE-9	CNA-Biological	Unknown	18.6	Entire length	2010	Yes
		Fecal Coliform	Unknown	18.6	Entire length	2010	Yes
		Iron	Unknown	18.6	Entire length	2010	No
Wills Creek	WVKE-9-B	CNA-Biological	Unknown	8.6	Entire length	2010	No
		Fecal Coliform	Unknown	8.6	Entire length	2010	No
Big Fork	WVKE-9-B-1	CNA-Biological	Unknown	1.6	Entire length	2010	No
		Fecal Coliform	Unknown	1.6	Entire length	2010	No

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Aarons Fork	WVKE-9-C	CNA-Biological	Unknown	6.0	Entire Length	2010	No
		Fecal Coliform	Unknown	6.0	Entire Length	2010	No
Bullskin Branch	WVKE-9-E	Fecal Coliform	Unknown	1.2	Entire length	2010	No
Wolfpen Branch	WVKE-9-F	Fecal Coliform	Unknown	1.6	Entire length	2010	No
Ruffner Branch	WVKE-9-G	Fecal Coliform	Unknown	1.3	Entire length	2010	No
Poca Fork	WVKE-9-I	CNA-Biological	Unknown	3.2	Entire length	2010	No
		Fecal Coliform	Unknown	3.2	Entire length	2010	No
		Iron	Unknown	3.2	Entire length	2010	No
Patterson Fork	WVKE-9-I-1	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Jakes Run	WVKE-9-J	Fecal Coliform	Unknown	2.0	Entire length	2010	No
Hurricane Branch	WVKE-9-P	CNA-Biological	Unknown	1.7	Entire length	2010	No
		Fecal Coliform	Unknown	1.7	Entire length	2010	No
Pinch Creek	WVKE-10	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Narrow Branch	WVKE-13	Fecal Coliform	Unknown	1.5	Entire length	2010	No
Blue Creek	WVKE-14	CNA-Biological	Unknown	3.0	RM 22.3 to HW	2010	No
		Iron	Unknown	25.3	Entire length	2010	No
Slack Branch	WVKE-14-G	Fecal Coliform	Unknown	1.6	Entire length	2010	No
		pH	Unknown	1.6	Entire length	2010	No
Whiteoak Fork	WVKE-14-G-2	Aluminum (d)	Unknown	3.0	Entire length	2010	No
		CNA-Biological	Unknown	3.0	Entire length	2010	Yes
		pH	Unknown	3.0	Entire length	2010	No
UNT/Whiteoak Fork RM 1.33	WVKE-14-G-2-B	Aluminum (d)	Unknown	1.0	Entire length	2010	No
		CNA-Biological	Unknown	1.0	Entire length	2010	No
		pH	Unknown	1.0	Entire length	2010	No
Joes Hollow	WVKE-14-K	pH	Unknown	1.0	Entire length	2010	No
Mudlick Branch	WVKE-14-M-2	Aluminum (d)	Unknown	1.6	Entire length	2010	No
		CNA-Biological	Unknown	1.6	Entire length	2010	Yes
		pH	Unknown	1.6	Entire length	2010	No

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Hidden Hollow	WVKE-14-M-4	Aluminum (d)	Unknown	1.5	Entire length	2010	No
		pH	Unknown	1.5	Entire length	2010	No
Fivemile Fork	WVKE-14-M-5	pH	Unknown	2.3	Entire length	2010	No
Middle Fork/Blue Creek	WVKE-14-O	Fecal Coliform	Unknown	7.5	Entire length	2010	No
Falling Rock Creek	WVKE-19	Fecal Coliform	Unknown	16.0	Entire length	2010	No
UNT/Falling Rock Creek RM 7.04	WVKE-19-C.8	Fecal Coliform	Unknown	0.6	Entire length	2010	No
Horse Fork	WVKE-19-G	pH	Unknown	3.6	Entire length	2010	No
Jordan Creek	WVKE-20	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Leatherwood Creek	WVKE-21	CNA-Biological	Unknown	5.1	Entire length	2010	No
		Fecal Coliform	Unknown	5.1	Entire length	2010	No
Big Sandy Creek	WVKE-23	CNA-Biological	Unknown	24.4	Entire length	2010	Yes
		Fecal Coliform	Unknown	24.4	Entire length	2010	Yes
		Iron	Unknown	24.4	Entire length	2010	No
Left Hand Creek	WVKE-23-D	CNA-Biological	Unknown	8.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	8.0	Entire length	2010	No
Hurricane Creek	WVKE-23-D-3	CNA-Biological	Unknown	6.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	6.7	Entire length	2010	No
Cottontree Run	WVKE-23-D-4	Fecal Coliform	Unknown	5.1	Entire length	2010	No
Coleman Run	WVKE-23-D-6	Fecal Coliform	Unknown	0.9	Entire length	2010	No
Left Hand Run	WVKE-23-L	Fecal Coliform	Unknown	6.8	Entire length	2010	No
		Iron	Unknown	6.8	Entire length	2010	No
Granny Creek	WVKE-23-N	Fecal Coliform	Unknown	6.3	Entire length	2010	No
Middle Fork/Big Sandy Creek	WVKE-23-Q	Fecal Coliform	Unknown	8.0	Entire length	2010	No
		Iron	Unknown	8.0	Entire length	2010	No
Hollywood Run	WVKE-23-Q-0.5	Fecal Coliform	Unknown	4.3	Entire length	2010	No
		Iron	Unknown	4.3	Entire length	2010	No

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Morris Creek	WVKE-26	Aluminum (d)	Unknown	4.2	Entire length	2010	TMDL Rev.
		Iron	Unknown	4.2	Entire length	2010	TMDL Rev.
		pH	Unknown	4.2	Entire length	2010	TMDL Rev.
Left Fork/Morris Creek	WVKE-26-A	Aluminum (d)	Unknown	2.2	Entire length	2010	TMDL Rev.
		CNA-Biological	Unknown	2.2	Entire length	2010	No
		Iron	Unknown	2.2	Entire length	2010	TMDL Rev.
		pH	Unknown	2.2	Entire length	2010	TMDL Rev.
Queen Shoals Creek	WVKE-27	CNA-Biological	Unknown	3.9	Entire length	2010	No
		Fecal Coliform	Unknown	3.9	Entire length	2010	No
Porter Creek	WVKE-30	Fecal Coliform	Unknown	8.9	Entire length	2010	No
UNT/Porter Creek RM 5.49	WVKE-30-L	CNA-Biological	Unknown	1.1	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.1	Entire length	2010	No
Camp Creek	WVKE-34	CNA-Biological	Unknown	3.1	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.1	Entire length	2010	No
Laurel Creek	WVKE-37	Fecal Coliform	Unknown	7.6	Entire length	2010	No
Laurel Fork	WVKE-37-B	CNA-Biological	Unknown	2.5	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.5	Entire length	2010	No
Horner Fork	WVKE-37-C	Fecal Coliform	Unknown	1.5	Entire length	2010	No
Reed Fork	WVKE-37-C-1	CNA-Biological	Unknown	1.9	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.9	Entire length	2010	No
Summers Fork	WVKE-37-D	CNA-Biological	Unknown	2.6	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.6	Entire length	2010	No
Sycamore Creek	WVKE-41	Fecal Coliform	Unknown	12.9	Entire length	2010	No
Adonijah Fork	WVKE-41-B	Fecal Coliform	Unknown	7.1	Entire length	2010	No
Right Fork/Sycamore Creek	WVKE-41-C	Fecal Coliform	Unknown	3.8	Entire length	2010	No
Grassy Fork	WVKE-41-C-1	CNA-Biological	Unknown	2.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.7	Entire length	2010	No

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Elk River RM 48.53	WVKE-43.5	Aluminum (d)	Unknown	0.6	Entire length	2010	No
		pH	Unknown	0.6	Entire length	2010	No
Middle Creek	WVKE-45	CNA-Biological	Unknown	7.9	Entire length	2010	No
		Fecal Coliform	Unknown	7.9	Entire length	2010	No
		Iron	Unknown	7.9	Entire length	2010	No
Lick Branch	WVKE-45-B	Fecal Coliform	Unknown	2.0	Entire length	2010	No
		Iron	Unknown	2.0	Entire length	2010	No
Leatherwood Creek	WVKE-46	CNA-Biological	Unknown	11.3	Entire length	2010	Yes
		Fecal Coliform	Unknown	11.3	Entire length	2010	No
		Iron	Unknown	11.3	Entire length	2010	No
		Selenium AQ	Unknown	11.3	Entire length	2010	No
Right Fork/Leatherwood Creek	WVKE-46-C	CNA-Biological	Unknown	4.0	Entire length	2010	No
		Iron	Unknown	4.0	Entire length	2010	No
		Selenium AQ	Unknown	4.0	Entire length	2010	No
Road Fork	WVKE-46-D	CNA-Biological	Unknown	2.4	Entire length	2010	No
		Fecal Coliform	Unknown	2.4	Entire length	2010	No
		Iron	Unknown	2.4	Entire length	2010	No
		Selenium AQ	Unknown	2.4	Entire length	2010	No
Buffalo Creek	WVKE-50	Aluminum (d)	Unknown	23.8	Entire length	2010	No
		CNA-Biological	Unknown	13.5	RM 10.3 to HW	2010	Yes
		Iron	Unknown	23.8	Entire length	2010	TMDL Rev.
		pH	Unknown	23.8	Entire length	2010	No
Big Branch	WVKE-50-B-3	CNA-Biological	Unknown	2.3	Entire length	2010	Yes
		Selenium AQ	Unknown	2.3	Entire length	2010	No
Beech Fork	WVKE-50-B-8	pH	Unknown	4.8	Entire length	2010	No
Hickory Fork	WVKE-50-H	Fecal Coliform	Unknown	6.2	Entire length	2010	No
		Iron (trout) AQ	Unknown	6.2	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Rockcamp Run	WVKE-50-I	Aluminum (d) (trout)	Unknown	6.5	Entire length	2010	No
		Fecal Coliform	Unknown	6.5	Entire length	2010	No
		pH	Unknown	6.5	Entire length	2010	No
Hickory Fork	WVKE-50-I-3	Aluminum (d)	Unknown	1.3	Entire length	2010	No
		pH	Unknown	1.3	Entire length	2010	No
Taylor Creek	WVKE-50-P	Aluminum (d)	Unknown	8.0	Entire length	2010	No
		CNA-Biological	Unknown	8.0	Entire length	2010	No
		pH	Unknown	8.0	Entire length	2010	No
Dille Run	WVKE-50-S	Aluminum (d)	Unknown	1.3	Entire length	2010	No
		CNA-Biological	Unknown	1.3	Entire length	2010	No
		pH	Unknown	1.3	Entire length	2010	Yes
Pheasant Run	WVKE-50-T	Aluminum (d)	Unknown	1.5	Entire length	2010	TMDL Rev.
		Iron	Unknown	1.5	Entire length	2010	TMDL Rev.
		pH	Unknown	1.5	Entire length	2010	TMDL Rev.
Big Otter Creek	WVKE-64	CNA-Biological	Unknown	11.3	Entire length	2010	No
		Fecal Coliform	Unknown	11.3	Entire length	2010	No
Moore Fork	WVKE-64-D	Fecal Coliform	Unknown	3.3	Entire length	2010	No
		Iron	Unknown	3.3	Entire length	2010	No
Wilson Fork	WVKE-64-D-1	Fecal Coliform	Unknown	2.6	Entire length	2010	No
Groves Creek	WVKE-69	Fecal Coliform	Unknown	6.5	Entire length	2010	No
O'Brion Creek	WVKE-70	Fecal Coliform	Unknown	3.8	Entire length	2010	No
		Iron	Unknown	3.8	Entire length	2010	No
Road Fork	WVKE-70-A	Fecal Coliform	Unknown	2.1	Entire length	2010	No
Duck Creek	WVKE-72	Fecal Coliform	Unknown	5.3	Entire length	2010	No
Tate Creek	WVKE-73	Fecal Coliform	Unknown	4.2	Entire length	2010	No
Strange Creek	WVKE-74	CNA-Biological	Unknown	16.0	Entire length	2010	No
		Fecal Coliform	Unknown	16.0	Entire length	2010	No
		Iron (trout) AQ	Unknown	16.0	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Dille Run	WVKE-74-H	Fecal Coliform	Unknown	6.1	Entire length	2010	No
Birch River	WVKE-76	CNA-Biological	Unknown	17.6	RM 17.9 to RM 35.5	2010	No
		Fecal Coliform	Unknown	38.5	Entire length	2010	No
		Iron	Unknown	28.7	Mouth to RM 28.7 (below Barnett Run)	2010	No
		Iron (trout) AQ	Unknown	9.8	RM 28.7 (below Barnett Run) to HW	2010	No
		Selenium AQ	Unknown	35.5	Mouth to RM 35.5	2010	No
Little Birch River	WVKE-76-E	Fecal Coliform	Unknown	19.8	Entire length	2010	No
		Iron	Unknown	19.8	Entire length	2010	No
Twolick Run	WVKE-76-E-6	Fecal Coliform	Unknown	3.0	Entire length	2010	No
Carpenter Fork	WVKE-76-E-7	Fecal Coliform	Unknown	3.4	Entire length	2010	No
Powell Creek	WVKE-76-L	Fecal Coliform	Unknown	6.1	Entire length	2010	No
Jacks Run	WVKE-76-W	Aluminum (d) (trout)	Unknown	1.3	Entire length	2010	No
		CNA-Biological	Mining	1.3	Entire length	2013	Yes
		Iron (trout) AQ	Unknown	1.3	Entire length	2010	No
Upper Mill Creek	WVKE-78	CNA-Biological	Unknown	4.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	4.8	Entire length	2010	No
Sugar Creek	WVKE-83	Fecal Coliform	Unknown	3.4	Entire length	2010	No
Little Otter Creek	WVKE-84	CNA-Biological	Unknown	2.8	Entire length	2010	No
Bear Run	WVKE-84.5	Fecal Coliform	Unknown	1.5	Entire length	2010	No
Granny Creek	WVKE-87	CNA-Biological	Unknown	5.0	Entire length	2010	No
		Fecal Coliform	Unknown	5.0	Entire length	2010	No
		Iron	Unknown	5.0	Entire length	2010	No
Laurel Fork	WVKE-87-B	CNA-Biological	Unknown	1.6	Entire length	2010	No
		Fecal Coliform	Unknown	1.6	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Granny Creek RM 4.16	WVKE-87-C	Fecal Coliform	Unknown	1.4	Entire length	2010	No
		Iron	Unknown	1.4	Entire length	2010	No
Old Woman Run	WVKE-88	CNA-Biological	Unknown	2.4	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.4	Entire length	2010	No
		Iron	Unknown	2.4	Entire length	2010	No
Fall Run	WVKE-98-B-3	pH	Unknown	2.4	Entire length	2015	Yes

LOWER KANAWHA WATERSHED - HUC# 05050008

101 streams 602 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Kanawha River (Lower)	WVK-lo	Fecal Coliform	Unknown	56.4	RM 1.5 to RM 57.9 (confluence with Elk River)	2015	Yes
		PCBs	Unknown	57.9	Mouth (confluence with Ohio) to RM 57.9 (confluence with Elk River)	2020	Yes
Threemile Creek (South)	WVK-4	CNA-Biological	Unknown	3.4	Entire length	2010	No
		Fecal Coliform	Unknown	3.4	Entire length	2010	No
Threemile Creek (North)	WVK-5	Fecal Coliform	Unknown	6.9	Entire length	2010	No
Fivemile Creek	WVK-6	Fecal Coliform	Unknown	3.5	Entire length	2010	No
		Iron	Unknown	3.5	Entire length	2010	No
Little Fivemile Creek	WVK-6-A	Fecal Coliform	Unknown	1.8	Entire length	2010	No
		Iron	Unknown	1.8	Entire length	2010	No
		Dissolved Oxygen	Unknown	1.8	Entire length	2010	No
Ninemile Creek	WVK-9	Fecal Coliform	Unknown	2.4	Entire length	2010	No
Upper Ninemile Creek	WVK-9-A	CNA-Biological	Unknown	4.6	Entire length	2010	No
		Fecal Coliform	Unknown	4.6	Entire length	2010	No
Cooper Fork	WVK-10-A	Fecal Coliform	Unknown	5.7	Entire length	2010	No
		Iron	Unknown	5.7	Entire length	2010	No
UNT/Cooper Fork RM 1.41	WVK-10-A-1	Iron	Unknown	2.0	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Pond Branch	WVK-11	CNA-Biological	Unknown	3.1	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.1	Entire length	2010	No
UNT/Pond Branch RM 1.74	WVK-11-0.5A	Fecal Coliform	Unknown	0.6	Entire length	2010	No
		Iron	Unknown	0.6	Entire length	2010	No
Thirteenmile Creek	WVK-12	Fecal Coliform	Unknown	25.7	Entire length	2010	No
		Iron	Unknown	25.7	Entire length	2010	No
Rocky Fork	WVK-12-A	Fecal Coliform	Unknown	3.0	Entire length	2010	No
		Iron	Unknown	3.0	Entire length	2010	No
Buzzard Creek	WVK-12-D	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Mudlick Fork	WVK-12-E	Fecal Coliform	Unknown	6.3	Entire length	2010	No
		Iron	Unknown	6.3	Entire length	2010	No
Poplar Fork	WVK-12-F	CNA-Biological	Unknown	6.2	Entire length	2010	Yes
		Fecal Coliform	Unknown	6.2	Entire length	2010	No
		Iron	Unknown	6.2	Entire length	2010	No
Little Sixteenmile Creek	WVK-13	Fecal Coliform	Unknown	9.4	Entire length	2010	No
Sixteenmile Creek	WVK-14	Fecal Coliform	Unknown	10.5	Entire length	2010	No
Eighteenmile Creek	WVK-16	Fecal Coliform	Unknown	36.2	Entire length	2010	No
		Iron	Unknown	36.2	Entire length	2010	No
Jakes Run	WVK-16-B	CNA-Biological	Unknown	1.0	Mouth to RM 1.0	2010	Yes
		Fecal Coliform	Unknown	1.9	Entire length	2010	No
Right Fork/Eighteenmile Creek	WVK-16-J	Fecal Coliform	Unknown	2.6	Entire length	2010	No
Saltlick Creek	WVK-16-J-3	CNA-Biological	Unknown	2.9	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.9	Entire length	2010	No
Cherry Fork	WVK-16-M	Fecal Coliform	Unknown	4.9	Entire length	2010	No
Buckelew Hollow	WVK-16-R	CNA-Biological	Unknown	1.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.7	Entire length	2010	No
		Iron	Unknown	1.7	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Cottrell Run	WVK-16-S	Fecal Coliform	Unknown	1.3	Entire length	2010	No
		Iron	Unknown	1.3	Entire length	2010	No
Five and Twenty Mile Creek	WVK-19	Fecal Coliform	Unknown	9.0	Entire length	2010	No
Evans Creek	WVK-19-B	Fecal Coliform	Unknown	4.0	Entire length	2010	No
UNT/Five and Twenty Mile Creek RM 7.41	WVK-19-D	CNA-Biological	Unknown	2.1	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.1	Entire length	2010	No
UNT/Little Buffalo Creek RM	WVK-20-A	CNA-Biological	Unknown	1.3	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.3	Entire length	2010	No
Hurricane Creek	WVK-22	CNA-Biological	Unknown	30.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	30.0	Entire length	2010	No
		Iron	Unknown	30.0	Entire length	2010	No
Poplar Fork	WVK-22-B	CNA-Biological	Unknown	11.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	11.8	Entire length	2010	No
		Iron	Unknown	11.8	Entire length	2010	No
Cow Creek	WVK-22-B-2	CNA-Biological	Unknown	4.4	Entire length	2010	Yes
		Fecal Coliform	Unknown	4.4	Entire length	2010	No
		Iron	Unknown	4.4	Entire length	2010	No
Long Branch	WVK-22-B-3	CNA-Biological	Unknown	2.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.8	Entire length	2010	No
		Iron	Unknown	2.8	Entire length	2010	No
Crooked Creek	WVK-22-B-5	Fecal Coliform	Unknown	3.4	Entire length	2010	No
		Iron	Unknown	3.4	Entire length	2010	No
UNT/Crooked Creek RM 0.72	WVK-22-B-5-B	CNA-Biological	Unknown	1.3	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.3	Entire length	2010	No
		Iron	Unknown	1.3	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Sleepy Creek	WVK-22-C	CNA-Biological	Unknown	3.9	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.9	Entire length	2010	No
		Iron	Unknown	3.9	Entire length	2010	No
Trace Creek	WVK-22-C-2	Fecal Coliform	Unknown	4.4	Entire length	2010	No
		Iron	Unknown	4.4	Entire length	2010	No
Mill Creek	WVK-22-F	CNA-Biological	Unknown	4.0	Entire length	2010	No
		Fecal Coliform	Unknown	4.0	Entire length	2010	No
		Iron	Unknown	4.0	Entire length	2010	No
Rider Creek	WVK-22-J	CNA-Biological	Unknown	1.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.7	Entire length	2010	No
Sams Fork	WVK-22-K	Fecal Coliform	Unknown	1.3	Entire length	2010	No
Little Hurricane Creek	WVK-24	Fecal Coliform	Unknown	6.7	Entire length	2010	No
		Iron	Unknown	6.7	Entire length	2010	No
Farley Creek	WVK-27	Fecal Coliform	Unknown	2.0	Entire length	2010	No
Bills Creek	WVK-28	CNA-Biological	Unknown	3.4	Entire length	2010	No
		Fecal Coliform	Unknown	3.4	Entire length	2010	No
Armour Creek	WVK-30	CNA-Biological	Unknown	3.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.7	Entire length	2010	No
		Iron	Unknown	3.7	Entire length	2010	No
Blakes Creek	WVK-30-A	CNA-Biological	Unknown	2.8	Entire length	2010	No
		Fecal Coliform	Unknown	2.8	Entire length	2010	No
Scary Creek	WVK-32	CNA-Biological	Unknown	5.8	Entire length	2010	No
		Fecal Coliform	Unknown	5.8	Entire length	2010	No
		Iron	Unknown	5.8	Entire length	2010	No
UNT/Scary Creek RM 0.14	WVK-32-0.1A	CNA-Biological	Unknown	0.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	0.8	Entire length	2010	No
		Iron	Unknown	0.8	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Rockstep Run	WVK-32-A	CNA-Biological	Unknown	2.3	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.3	Entire length	2010	No
		Iron	Unknown	2.3	Entire length	2010	No
UNT/UNT RM 0.33/Scary Creek RM 2.13	WVK-32-B-1	CNA-Biological	Unknown	1.5	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.5	Entire length	2010	No
		Iron	Unknown	1.5	Entire length	2010	No
Gallatin Branch	WVK-33	CNA-Biological	Unknown	1.6	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.6	Entire length	2010	No
Davis Creek	WVK-39	CNA-Biological	Unknown	10.5	Mouth to RM 10.5	2010	No
		Fecal Coliform	Unknown	15.6	Entire length	2010	No
		Iron	Unknown	15.6	Entire length	2010	No
Ward Hollow	WVK-39-A	Fecal Coliform	Unknown	1.7	Entire length	2010	No
Trace Fork	WVK-39-B	CNA-Biological	Unknown	6.3	Entire length	2010	No
		Fecal Coliform	Unknown	6.3	Entire length	2010	No
		Iron	Unknown	6.3	Entire length	2010	No
Middle Fork/Davis Creek	WVK-39-E	Fecal Coliform	Unknown	6.0	Entire length	2010	No
Rays Branch	WVK-39-F	CNA-Biological	Unknown	2.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.7	Entire length	2010	No
Coal Hollow	WVK-39-J	CNA-Biological	Unknown	1.6	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.6	Entire length	2010	No
Cane Fork	WVK-39-L	CNA-Biological	Unknown	2.8	Entire length	2010	No
		Fecal Coliform	Unknown	2.8	Entire length	2010	No
Kanawha Fork	WVK-39-M	Fecal Coliform	Unknown	2.4	Entire length	2010	No
Hoffman Hollow	WVK-39-M-1-A	pH	Unknown	2.3	Entire length	2010	No
Joplin Branch	WVK-42	CNA-Biological	Unknown	2.9	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.9	Entire length	2010	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
POCATALICO RIVER SUBWATERSHED							
Pocatalico River	WVKP	CNA-Biological	Unknown	65.6	Mouth to RM 65.6	2010	Yes
		Fecal Coliform	Unknown	73.0	Entire length	2010	No
		Iron	Unknown	73.0	Entire length	2010	No
UNT/Pocatalico River RM 8.52	WVKP-2.5	Aluminum (d)	Unknown	0.7	Entire length	2010	No
		pH	Unknown	0.7	Entire length	2010	No
Kelly Creek	WVKP-3	pH	Unknown	1.1	Entire length	2010	No
Harmond Creek	WVKP-4	CNA-Biological	Unknown	2.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.8	Entire length	2010	No
UNT/Harmond Creek RM 1.00	WVKP-4-B	Aluminum (d)	Unknown	0.7	Entire length	2010	No
		pH	Unknown	0.7	Entire length	2010	No
Rocky Fork	WVKP-5	CNA-Biological	Unknown	6.9	Entire length	2010	Yes
		Fecal Coliform	Unknown	6.9	Entire length	2010	No
		Iron	Unknown	6.9	Entire length	2010	No
Fisher Branch	WVKP-5-A	Fecal Coliform	Unknown	3.5	Entire length	2010	No
Wolfpen Run	WVKP-5-B	Fecal Coliform	Unknown	1.9	Entire length	2010	No
		Iron	Unknown	1.9	Entire length	2010	No
UNT/Rocky Fork RM 4.32	WVKP-5-B.5	Fecal Coliform	Unknown	2.5	Entire length	2010	No
		Iron	Unknown	2.5	Entire length	2010	No
Howard Fork	WVKP-5-C	Fecal Coliform	Unknown	3.3	Entire length	2010	No
		Iron	Unknown	3.3	Entire length	2010	No
Martin Branch	WVKP-7	Fecal Coliform	Unknown	4.2	Entire length	2010	No
		Iron	Unknown	4.2	Entire length	2010	No
Schoolhouse Branch	WVKP-8	Fecal Coliform	Unknown	0.8	Entire length	2010	No
		Iron	Unknown	0.8	Entire length	2010	No
Campbells Branch	WVKP-8.5	Fecal Coliform	Unknown	1.1	Entire length	2010	No

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WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Kelly Creek	WVKP-9	CNA-Biological	Unknown	5.0	Entire length	2010	No
		Fecal Coliform	Unknown	5.0	Entire length	2010	No
		Iron	Unknown	5.0	Entire length	2010	No
UNT/Kelly Creek RM 0.51	WVKP-9-0.5A	Iron	Unknown	0.9	Entire length	2010	No
		pH	Unknown	0.9	Entire length	2010	No
Spring Branch	WVKP-9-A	Fecal Coliform	Unknown	1.4	Entire length	2010	No
		Iron	Unknown	1.4	Entire length	2010	No
Frog Creek	WVKP-10	Fecal Coliform	Unknown	7.7	Entire length	2010	No
		Iron	Unknown	7.7	Entire length	2010	No
Derrick Creek	WVKP-12	Fecal Coliform	Unknown	3.9	Entire length	2010	No
Grapevine Creek	WVKP-16	CNA-Biological	Unknown	6.5	Entire length	2010	Yes
		Fecal Coliform	Unknown	6.5	Entire length	2010	No
Right Fork	WVKP-16-A	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Boardtree Run	WVKP-16-B	CNA-Biological	Unknown	1.7	Entire length	2010	Yes
		Fecal Coliform	Unknown	1.7	Entire length	2010	No
Pocatalico Creek	WVKP-17	CNA-Biological	Unknown	13.5	Entire length	2010	No
		Fecal Coliform	Unknown	13.5	Entire length	2010	No
		Iron	Unknown	13.5	Entire length	2010	No
Middle Fork/Pocatalico Creek	WVKP-17-B	CNA-Biological	Unknown	14.5	Entire length	2010	No
		Fecal Coliform	Unknown	14.5	Entire length	2010	No
		Iron	Unknown	14.5	Entire length	2010	No
Allen Fork	WVKP-17-C	Fecal Coliform	Unknown	6.5	Entire length	2010	No
Raccoon Creek	WVKP-20	CNA-Biological	Unknown	3.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.0	Entire length	2010	No
Leatherwood Creek	WVKP-22	CNA-Biological	Unknown	4.2	Entire length	2010	Yes
		Fecal Coliform	Unknown	4.2	Entire length	2010	No
Camp Creek	WVKP-26	CNA-Biological	Unknown	2.2	Entire length	2010	Yes
Coleman Fork	WVKP-28-A	Fecal Coliform	Unknown	2.8	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Anderson Lick Run	WVKP-28-E	CNA-Biological	Unknown	1.3	Entire length	2010	Yes
Straight Creek	WVKP-29	CNA-Biological	Unknown	2.5	Entire length	2010	No
Flat Fork	WVKP-33	Fecal Coliform	Unknown	12.6	Entire length	2010	No
Higby Run	WVKP-33-B	Fecal Coliform	Unknown	4.4	Entire length	2010	No
Cox Fork	WVKP-33-E	Fecal Coliform	Unknown	5.2	Entire length	2010	No
Cabbage Fork	WVKP-33-G	Fecal Coliform	Unknown	2.2	Entire length	2010	No
McKown Creek	WVKP-37	CNA-Biological	Unknown	2.6	Entire length	2010	No
		Fecal Coliform	Unknown	2.6	Entire length	2010	No
Johnson Creek	WVKP-38	Fecal Coliform	Unknown	7.5	Entire length	2010	No
Greathouse Hollow	WVKP-38-0.8A	Fecal Coliform	Unknown	0.7	Entire length	2010	No
Big Lick Run	WVKP-39	Fecal Coliform	Unknown	6.0	Entire length	2010	No
Silcott Fork	WVKP-39-A	Fecal Coliform	Unknown	2.7	Entire length	2010	No
		Iron	Unknown	2.7	Entire length	2010	No
Rush Creek	WVKP-41	Fecal Coliform	Unknown	3.8	Entire length	2010	No
Laurel Fork	WVKP-43	Fecal Coliform	Unknown	3.8	Entire length	2010	No

NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002

23 streams 178 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Green Spring Run	WVPNB-1	Fecal Coliform	Unknown	6.1	Entire length	2010	No
Patterson Creek	WVPNB-4	Fecal Coliform	Unknown	57.4	Entire length	2010	Yes
Plum Run	WVPNB-4-A	Fecal Coliform	Unknown	5.3	Entire length	2010	No
UNT/Painter Run RM 0.91	WVPNB-4-C-2	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Horseshoe Creek	WVPNB-4-C.5	CNA-Biological	Unknown	5.3	Entire length	2010	No
		Fecal Coliform	Unknown	5.3	Entire length	2010	No
Cabin Run	WVPNB-4-J	CNA-Biological	Unknown	9.8	Entire length	2010	Yes
		Fecal Coliform	Unknown	9.8	Entire length	2010	No
Pargut Run	WVPNB-4-J-1	CNA-Biological	Unknown	3.4	Entire length	2010	Yes
		Fecal Coliform	Unknown	3.4	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Patterson Creek RM 16.25	WVPNB-4-J.5	CNA-Biological	Unknown	4.0	Entire length	2010	Yes
		Fecal Coliform	Unknown	4.0	Entire length	2010	No
Beaver Run	WVPNB-4-N	Fecal Coliform	Unknown	5.1	Entire length	2010	No
Mill Creek	WVPNB-4-S	CNA-Biological	Unknown	5.6	Entire length	2010	Yes
		Fecal Coliform	Unknown	5.6	Entire length	2010	No
Elliber Run	WVPNB-4-V	Fecal Coliform	Unknown	4.8	Entire length	2010	No
Mikes Run	WVPNB-4-W	Fecal Coliform	Unknown	8.1	Entire length	2010	No
North Fork/Patterson Creek	WVPNB-4-EE	Fecal Coliform	Unknown	9.4	Entire length	2010	No
Elklick Run	WVPNB-4-EE-13	Fecal Coliform	Unknown	4.1	Entire length	2010	No
UNT/North Fork RM 8.37/Patterson Creek	WVPNB-4-EE-14	Fecal Coliform	Unknown	4.1	Entire length	2010	No
Middle Fork/Patterson Creek	WVPNB-4-FF	CNA-Biological	Unknown	5.9	Entire length	2010	No
		Fecal Coliform	Unknown	5.9	Entire length	2010	No
UNT/UNT RM 1.31/Middle Fork RM 3.83	WVPNB-4-FF-5-A	CNA-Biological	Unknown	1.1	Entire length	2010	Yes
New Creek	WVPNB-7	CNA-Biological	Unknown	3.6	Mouth to RM 3.6	2010	Yes
		Fecal Coliform	Unknown	22.0	Entire length	2010	Yes
UNT/New Creek RM 1.30	WVPNB-7-0.5A	Fecal Coliform	Unknown	1.4	Entire length	2010	No
Stony Run	WVPNB-7-A	Fecal Coliform	Unknown	3.0	Entire length	2010	No
Block Run	WVPNB-7-C	Fecal Coliform	Unknown	3.9	Entire length	2010	No
UNT/New Creek RM 4.26	WVPNB-7-C.4	CNA-Biological	Unknown	2.5	Entire length	2010	Yes
		Fecal Coliform	Unknown	2.5	Entire length	2010	No
King Run	WVPNB-7-E	Fecal Coliform	Unknown	3.3	Entire length	2010	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
TYGART VALLEY WATERSHED - HUC# 05020001					*1 Lake 1750 acres*	*51 streams 377 miles*	
Tygart Valley River	WVMT	Fecal Coliform	Unknown	134.7	Entire length	2015	Yes
Tygart Lake	WVMT-(L1)	PCBs	Unknown	1750.0	Entire length	2020	Yes
Wickwire Run	WVMT-8	CNA-Biological	Unknown	8.0	Entire length	2015	Yes
Three Fork Creek	WVMT-12	Aluminum (d)	Unknown	19.0	Entire length	2015	Yes
Raccoon Creek	WVMT-12-C	Aluminum (d)	Unknown	8.8	Entire length	2015	Yes
Squires Creek	WVMT-12-H-1	CNA-Biological	Unknown	4.5	Entire length	2025	No
UNT/Birds Creek RM 2.57	WVMT-12-H-4	CNA-Biological	Unknown	2.2	Entire length	2020	Yes
Little Sandy Creek	WVMT-18-E	Aluminum (d)	Unknown	10.6	Entire length	2015	Yes
		CNA-Biological	Unknown	10.6	Entire length	2015	Yes
Laurel Creek	WVMT-24	Iron (trout) AQ	Unknown	5.3	Entire length	2020	Yes
Sugar Creek	WVMT-24-C	CNA-Biological	Unknown	12.0	Entire length	2015	Yes
Long Run	WVMT-24-C-4	CNA-Biological	Unknown	1.6	Entire length	2015	Yes
Hackers Creek	WVMT-26	CNA-Biological	Unknown	4.6	Entire length	2015	Yes
Foxgrape Run	WVMT-26-B	CNA-Biological	Unknown	3.4	Entire length	2015	Yes
Beaver Creek	WVMT-37	Aluminum (d)	Unknown	4.6	Entire length	2020	Yes
Little Laurel Run	WVMT-40-A	pH	Unknown	3.8	Entire length	2015	Yes
Grassy Run	WVMT-41	Aluminum (d)	Unknown	2.8	Entire length	2020	Yes
Roaring Creek	WVMT-42	Aluminum (d)	Unknown	15.0	Entire length	2015	Yes
UNT/Roaring Creek RM 4.09	WVMT-42-F	pH	Unknown	1.2	Entire length	2015	Yes
Craven Run	WVMT-43-A	CNA-Biological	Unknown	5.6	Entire length	2015	Yes
Davis Lick	WVMT-43-H	CNA-Biological	Unknown	2.3	Mouth to RM 2.3	2015	Yes
Laurel Run	WVMT-43-O	CNA-Biological	Unknown	2.5	Entire length	2015	Yes
Glade Run	WVMT-64-C	Iron (trout) AQ, HH	Unknown	1.8	Entire length	2015	Yes
		pH	Unknown	1.8	Entire length	2015	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Meatbox Run	WVMT-64-E	pH	Unknown	1.3	Entire length	2015	Yes
Potatohole Fork	WVMT-64-F	pH	Unknown	2.0	Entire length	2015	Yes
Riffle Creek	WVMT-66	CNA-Biological	Unknown	1.5	Mouth to RM 1.5	2015	Yes
Poundmill Run	WVMT-69	CNA-Biological	Unknown	2.6	Entire length	2020	Yes
BUCKHANNON RIVER SUBWATERSHED							
Big Run	WVMTB-8	CNA-Biological	Unknown	1.9	Entire length	2020	Yes
Childers Run	WVMTB-9	CNA-Biological	Unknown	2.3	Entire length	2015	Yes
Wash Run	WVMTB-11-B.5	CNA-Biological	Unknown	1.9	Entire length	2020	Yes
Little Sand Run	WVMTB-13	Fecal Coliform	Unknown	3.4	Entire length	2020	Yes
Left Fork/Little Sand Run	WVMTB-13-A	Fecal Coliform	Unknown	2.5	Entire length	2020	Yes
Ratcliff Run	WVMTB-14	Fecal Coliform	Unknown	2.9	Entire length	2020	Yes
Cutright Run	WVMTB-17	pH	Unknown	4.2	Entire length	2015	Yes
French Creek	WVMTB-18	Iron (trout) AQ	Unknown	18.5	Entire length	2020	Yes
Sawmill Run	WVMTB-20	CNA-Biological	Unknown	1.6	Entire length	2015	Yes
Laurel Run/Buckhannon River	WVMTB-24	CNA-Biological	Unknown	2.5	Entire length	2020	Yes
Right Fork/Tenmile Creek	WVMTB-25-A	pH	Unknown	4.0	Entire length	2015	Yes
Smooth Rock Lick Run	WVMTB-32-A	pH	Unknown	2.0	Entire length	2015	Yes
Bearcamp Run	WVMTB-32-D	pH	Unknown	5.5	Entire length	2015	Yes
Beech Run	WVMTB-32-H	pH	Unknown	5.2	Entire length	2015	Yes
MIDDLE FORK RIVER SUBWATERSHED							
Middle Fork River	WVMTM	CNA-Biological	Unknown	5.8	RM 23.1 (Long Run) to RM 28.9 (Cassity Fk)	2025	No
Laurel Run/Middle Fork River	WVMTM-2	pH	Unknown	2.0	Entire length	2015	Yes
Hooppole Run	WVMTM-3	CNA-Biological	Unknown	1.6	Entire length	2015	Yes
Service Run	WVMTM-5	pH	Unknown	1.0	Entire length	2015	Yes
Short Run	WVMTM-7	pH	Unknown	1.7	Entire length	2015	Yes
Right Fork/Middle Fork River	WVMTM-11	Iron (trout) AQ	Unknown	15.3	Entire length	2015	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Cassity Fork	WVMTM-16	Aluminum (d)	Unknown	2.0	Mouth to RM 2.0	2020	Yes
		Aluminum (d) (trout)	Unknown	4.5	RM 2.0 to HW	2020	Yes
		pH	Unknown	4.5	RM 2.0 to HW	2015	Yes
Three Forks Run	WVMTM-17	CNA-Biological	Unknown	2.6	Entire length	2015	Yes
Pleasant Run	WVMTM-21	CNA-Biological	Unknown	2.3	Entire length	2020	Yes
Birch Fork	WVMTM-26	pH	Unknown	6.6	Entire length	2015	Yes
Rocky Run	WVMTM-26-B	CNA-Biological	Unknown	5.8	Entire length	2015	Yes
Kittle Creek	WVMTM-28	pH	Unknown	6.2	Entire length	2015	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP C							
GAULEY WATERSHED - HUC# 05050005						*26 streams 248 miles*	
Scrabble Creek	WVKG-1	CNA-Biological	Mining	3.1	Entire length	2013	Yes
Left Fork/Scrabble Creek	WVKG-1-A	CNA-Biological	Mining	2.2	Entire length	2013	Yes
Boardtree Branch	WVKG-5-M	CNA-Biological	Mining	2.1	Entire length	2013	Yes
Sugarcamp Branch	WVKG-5-N	CNA-Biological	Mining	0.1	Entire length	2013	Yes
Stillhouse Branch	WVKG-5-O	CNA-Biological	Mining	1.9	Entire length	2013	Yes
Robinson Fork	WVKG-5-P	CNA-Biological	Mining	3.6	Entire length	2013	Yes
Right Fork/Robinson Fork	WVKG-5-P-1	CNA-Biological	Unknown	1.4	Entire length	2021	Yes
Meadow River	WVKG-19	Fecal Coliform	Unknown	68.8	Entire length	2016	Yes
Meadow Creek	WVKG-19-P	Iron	Unknown	10.0	Entire length	2021	No
UNT/Meadow Creek RM 5.37	WVKG-19-P-0.8	Iron	Unknown	0.9	Entire length	2021	No
Otter Creek	WVKG-19-W	Iron	Unknown	6.5	Entire length	2021	Yes
Hominy Creek	WVKG-24	Iron (trout) AQ	Unknown	17.3	Mouth to 17.3	2021	Yes
Line Laurel Creek	WVKG-24-E-3	Iron (trout) AQ	Unknown	4.6	Entire length	2021	Yes
Jims Branch	WVKG-32-G	Iron (trout) AQ, HH	Unknown	4.6	Entire length	2021	Yes
Cherry River	WVKG-34	Iron (trout) AQ	Unknown	10.5	Entire length	2021	Yes
Elklick Run	WVKG-34-G-5	Iron (trout) AQ	Unknown	1.9	Entire length	2021	No
North Fork/Cherry River	WVKG-34-H	Aluminum (d) (trout)	Unknown	21.6	Entire length	2021	Yes
Desert Branch	WVKG-34-H-2	pH	Unknown	1.9	Entire length	2021	Yes
Rabbit Run	WVKG-34-H-11	pH	Unknown	1.4	Entire length	2021	Yes
Bear Run	WVKG-34-H-14	pH	Unknown	2.2	Entire length	2021	Yes
Big Ditch Run	WVKG-46	CNA-Biological	Unknown	3.1	Entire length	2021	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
CRANBERRY RIVER SUBWATERSHED							
Cranberry River	WVKGC	Aluminum (d) (trout)	Unknown	27.6	Entire length	2016	Yes
WILLIAMS RIVER SUBWATERSHED							
Williams River	WVKGW	Aluminum (d) (trout)	Unknown	29.8	RM 3.0 to HW	2021	Yes
Middle Fork/Williams River	WVKGW-10	Aluminum (d) (trout)	Unknown	12.9	Entire length	2016	Yes
Beechy Run	WVKGW-10-C	pH	Unknown	3.9	Entire length	2021	Yes
Sugar Creek	WVKGW-21	Aluminum (d) (trout)	Unknown	3.8	Entire length	2016	Yes

LOWER GUYANDOTTE WATERSHED - HUC# 05070102

52 streams 198 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Davis Creek	WVOG-3	CNA-Biological	Unknown	2.8	Entire length	2016	Yes
Edens Branch	WVOG-3-0.5A	CNA-Biological	Unknown	1.0	Entire length	2021	Yes
Smith Creek	WVOG-11	CNA-Biological	Unknown	3.7	Entire length	2016	Yes
Cavill Creek	WVOG-12	CNA-Biological	Unknown	2.6	Entire length	2021	Yes
Madison Creek	WVOG-17	CNA-Biological	Unknown	4.0	Entire length	2016	Yes
Twomile Creek	WVOG-24	CNA-Biological	Unknown	3.8	Entire length	2021	Yes
Fourmile Creek	WVOG-27	CNA-Biological	Unknown	8.0	Entire length	2021	Yes
Ninemile Creek	WVOG-31	CNA-Biological	Unknown	7.1	Entire length	2021	Yes
Tenmile Creek	WVOG-32	CNA-Biological	Unknown	7.5	Entire length	2021	Yes
Lick Branch	WVOG-34-A	CNA-Biological	Unknown	2.3	Entire length	2016	Yes
Aarons Creek	WVOG-35	CNA-Biological	Unknown	3.0	Entire length	2016	Yes
Laurel Creek	WVOG-38-D	CNA-Biological	Unknown	2.8	Mouth to RM 2.8	2021	Yes
Dry Run	WVOG-41	CNA-Biological	Unknown	1.3	Entire length	2016	Yes
Short Bend Fork	WVOG-42-A	CNA-Biological	Unknown	1.2	Entire length	2016	Yes
Laurel Fork	WVOG-42-C	CNA-Biological	Unknown	1.7	Entire length	2016	Yes
West Fork/Big Harts Creek	WVOG-44-A	CNA-Biological	Unknown	2.4	Entire length	2021	Yes
Smokehouse Fork	WVOG-44-E	CNA-Biological	Unknown	8.7	Entire length	2021	Yes
Buck Fork	WVOG-44-G	CNA-Biological	Unknown	5.7	Entire length	2021	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Bulwark Branch	WVOG-44-K	CNA-Biological	Unknown	1.6	Entire length	2016	Yes
Vickers Branch	WVOG-49-C	CNA-Biological	Unknown	1.2	Entire length	2016	Yes
UNT/Big Creek RM 3.28	WVOG-49-C.1	CNA-Biological	Unknown	0.3	Entire length	2016	Yes
Trace Fork	WVOG-49-D	CNA-Biological	Unknown	5.9	Entire length	2021	Yes
Hurricane Branch	WVOG-49-D-1	CNA-Biological	Unknown	1.9	Entire length	2021	Yes
Garrett Fork	WVOG-49-E	CNA-Biological	Unknown	4.0	Entire length	2021	Yes
Perrys Branch	WVOG-49-E-1	CNA-Biological	Unknown	1.0	Entire length	2016	Yes
South Fork/Crawley Creek	WVOG-51-G.5	CNA-Biological	Unknown	1.8	Entire length	2016	Yes
Fowler Branch	WVOG-51.5	CNA-Biological	Unknown	1.1	Entire length	2016	Yes
Mill Creek	WVOG-59	CNA-Biological	Unknown	2.4	Entire length	2016	Yes
MUD RIVER SUBWATERSHED							
Tanyard Branch	WVOGM-1.5	CNA-Biological	Unknown	1.5	Entire length	2021	Yes
Little Cabell Creek	WVOGM-3	CNA-Biological	Unknown	3.3	Entire length	2016	Yes
Big Cabell Creek	WVOGM-4	CNA-Biological	Unknown	7.4	Entire length	2021	Yes
Fudges Creek	WVOGM-6	CNA-Biological	Unknown	6.7	Entire length	2021	Yes
Wire Branch	WVOGM-6-0.5A	CNA-Biological	Unknown	1.9	Entire length	2021	Yes
Mill Creek	WVOGM-8	CNA-Biological	Unknown	4.2	Entire length	2021	Yes
Right Fork/Mill Creek	WVOGM-8-C	CNA-Biological	Unknown	2.8	Entire length	2016	Yes
Johns Branch	WVOGM-11	CNA-Biological	Unknown	2.5	Entire length	2021	Yes
Indian Fork	WVOGM-12	CNA-Biological	Unknown	6.5	Entire length	2016	Yes
Charley Creek	WVOGM-14	CNA-Biological	Unknown	8.7	Entire length	2021	Yes
Trace Creek	WVOGM-19	CNA-Biological	Unknown	3.0	Entire length	2021	No
Trace Fork	WVOGM-20	CNA-Biological	Unknown	17.9	RM 6.4 to HW	2016	Yes
Coon Creek	WVOGM-20-A	CNA-Biological	Unknown	3.3	Entire length	2016	Yes
Big Creek	WVOGM-20-D	CNA-Biological	Unknown	7.0	Entire length	2021	Yes
Straight Fork	WVOGM-22-A	CNA-Biological	Unknown	1.7	Mouth to RM 1.7	2016	Yes
Meadow Branch	WVOGM-25-A	CNA-Biological	Unknown	1.8	Entire length	2016	Yes
Straight Fork	WVOGM-25-H	CNA-Biological	Unknown	7.4	Entire length	2021	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Valley Fork	WVOGM-25-H-1	CNA-Biological	Unknown	2.9	Entire length	2016	Yes
Sugartree Fork	WVOGM-25-I	CNA-Biological	Unknown	1.4	Mouth to RM 1.4	2016	Yes
Big Creek	WVOGM-35	CNA-Biological	Unknown	1.8	Mouth to RM 1.8	2021	Yes
Left Fork/Mud River	WVOGM-39	CNA-Biological	Unknown	8.9	RM 3.3 to HW	2016	Yes
Stinson Branch	WVOGM-39-E	CNA-Biological	Unknown	2.6	Entire length	2021	Yes
Upton Branch	WVOGM-40.3	CNA-Biological	Unknown	2.9	Entire length	2021	Yes
Ballard Fork	WVOGM-49	CNA-Biological	Unknown	2.3	Entire length	2016	Yes

MIDDLE OHIO NORTH WATERSHED - HUC# 05030201

86 streams 646 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Ohio River (Middle North)	WVO-mn	Dioxin	Unknown	58.4	MP 172.2 to MP 113.8 (Entire length)	2015	Yes
		Bacteria	Unknown	40.1	MP 172.2 to MP 163.1; 157.7-146.9; 141.5-136.1; 131.3-127.0; 124.3-113.8	2012	Yes
		Iron	Unknown	58.4	MP 172.2 to MP 113.8 (Entire length)	2018	Yes
Atward Run	WVO-53-H	Iron	Unknown	1.3	Entire length	2011	No
Cow Creek	WVO-55	Fecal Coliform	Unknown	9.4	Entire length	2011	No
French Creek	WVO-57	Fecal Coliform	Unknown	7.6	Entire length	2011	No
Right Fork/French Creek	WVO-57-E	Fecal Coliform	Unknown	3.9	Entire length	2011	No
Left Fork/French Creek	WVO-57-F	Fecal Coliform	Unknown	4.3	Entire length	2011	No
Sugarcamp Run	WVO-63	Fecal Coliform	Unknown	2.0	Entire length	2011	No
		Iron	Unknown	2.0	Entire length	2011	No
Cow Hollow Run	WVO-66	CNA-Biological	Unknown	2.2	Entire length	2011	Yes
		Fecal Coliform	Unknown	2.2	Entire length	2011	No
Fishing Creek	WVO-69	Fecal Coliform	Unknown	23.0	Entire length	2011	No
		Iron	Unknown	23.0	Entire length	2011	No

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Doolin Run	WVO-69-A	CNA-Biological	Unknown	5.3	Entire length	2011	Yes
		Fecal Coliform	Unknown	5.3	Entire length	2011	No
Little Fishing Creek	WVO-69-C	CNA-Biological	Unknown	20.3	Entire length	2011	Yes
		Fecal Coliform	Unknown	20.3	Entire length	2011	No
		Iron	Unknown	20.3	Entire length	2011	No
Scheidler Run	WVO-69-C-5	Fecal Coliform	Unknown	3.6	Entire length	2011	No
Rush Run	WVO-69-C-7	Fecal Coliform	Unknown	3.3	Entire length	2011	No
State Run	WVO-69-F	Iron	Unknown	4.1	Entire length	2011	No
Brush Run	WVO-69-H	Fecal Coliform	Unknown	4.0	Entire length	2011	No
		Iron	Unknown	4.0	Entire length	2011	No
Crow Run	WVO-69-J	Fecal Coliform	Unknown	4.7	Entire length	2011	No
South Fork/Fishing Creek	WVO-69-N	CNA-Biological	Unknown	20.4	Entire length	2011	Yes
		Fecal Coliform	Unknown	20.4	Entire length	2011	No
		Iron	Unknown	20.4	Entire length	2011	No
Upper Run	WVO-69-N-3	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Buffalo Run	WVO-69-N-5	CNA-Biological	Unknown	6.1	Entire length	2011	No
		Fecal Coliform	Unknown	6.1	Entire length	2011	No
		Iron	Unknown	6.1	Entire length	2011	No
Richwood Run	WVO-69-N-6	Fecal Coliform	Unknown	4.9	Entire length	2011	No
Arches Fork	WVO-69-N-7	CNA-Biological	Unknown	6.2	Entire length	2011	No
		Fecal Coliform	Unknown	6.2	Entire length	2011	No
		Iron	Unknown	6.2	Entire length	2011	No
Slabcamp Run	WVO-69-N-7-A	Fecal Coliform	Unknown	1.9	Entire length	2011	No
		Iron	Unknown	1.9	Entire length	2011	No
Fallen Timber Run	WVO-69-N-8	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
		Iron	Unknown	3.6	Entire length	2011	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Price Run	WVO-69-N-9	CNA-Biological	Unknown	4.4	Entire length	2011	Yes
		Fecal Coliform	Unknown	4.4	Entire length	2011	No
		Iron	Unknown	4.4	Entire length	2011	No
Buck Run	WVO-69-N-9-B	Fecal Coliform	Unknown	1.9	Entire length	2011	No
Stout Run	WVO-69-N-11	Fecal Coliform	Unknown	1.5	Entire length	2011	No
Trader Fork	WVO-69-N-12	Fecal Coliform	Unknown	3.0	Entire length	2011	No
North Fork/Fishing Creek	WVO-69-O	Fecal Coliform	Unknown	16.1	Entire length	2011	No
		Iron	Unknown	16.1	Entire length	2011	No
Maud Run	WVO-69-O-3	Fecal Coliform	Unknown	2.3	Entire length	2011	No
Willey Fork	WVO-69-O-6	Fecal Coliform	Unknown	7.4	Entire length	2011	No
Morgan Run	WVO-69-O-6-E	Fecal Coliform	Unknown	1.9	Entire length	2011	No
Williams Run	WVO-70	Fecal Coliform	Unknown	1.7	Entire length	2011	No
Proctor Creek	WVO-72	CNA-Biological	Unknown	9.1	Entire length	2011	No
MIDDLE ISLAND CREEK SUBWATERSHED							
Middle Island Creek	WVOMI	CNA-Biological	Unknown	44.0	RM 34.7 to HW	2011	Yes
		Fecal Coliform	Unknown	78.7	Entire length	2011	Yes
		Iron	Unknown	78.7	Entire length	2011	Yes
		PCBs	Unknown	78.7	Entire length	2021	Yes
McKim Creek	WVOMI-4	CNA-Biological	Unknown	4.6	Mouth to RM 4.6	2011	No
		Fecal Coliform	Unknown	20.4	Entire length	2011	No
Bogart Run	WVOMI-6	Fecal Coliform	Unknown	1.4	Entire length	2011	No
Sugar Creek	WVOMI-9	CNA-Biological	Unknown	15.0	Entire length	2011	Yes
		Fecal Coliform	Unknown	15.0	Entire length	2011	No
Allen Run	WVOMI-13	Fecal Coliform	Unknown	2.1	Entire length	2011	No
		Iron	Unknown	2.1	Entire length	2011	No
Buffalo Run	WVOMI-15	Fecal Coliform	Unknown	5.0	Entire length	2011	No
UNT/Buffalo Run RM 0.99	WVOMI-15-0.3A	Fecal Coliform	Unknown	4.0	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/UNT RM 1.63/Buffalo Run RM 0.99	WVOMI-15-0.3A-5	Fecal Coliform	Unknown	1.5	Entire length	2011	No
Shrivers Run	WVOMI-18	Fecal Coliform	Unknown	1.7	Entire length	2011	No
Allen Run	WVOMI-19	Fecal Coliform	Unknown	1.2	Entire length	2011	No
Sancho Creek	WVOMI-21	CNA-Biological	Unknown	9.6	Mouth to RM 7.5	2011	Yes
Little Sancho Creek	WVOMI-21-A	Fecal Coliform	Unknown	3.6	Entire length	2011	No
Point Pleasant Creek	WVOMI-23	CNA-Biological	Unknown	10.4	Entire length	2011	No
		Fecal Coliform	Unknown	10.4	Entire length	2011	No
Pursley Creek	WVOMI-23-A	CNA-Biological	Unknown	7.5	Entire length	2011	No
		Fecal Coliform	Unknown	7.5	Entire length	2011	No
		Iron	Unknown	7.5	Entire length	2011	No
Elk Fork	WVOMI-23-B	Fecal Coliform	Unknown	14.8	Entire length	2011	No
		Iron	Unknown	14.8	Entire length	2011	No
Mudlick Run	WVOMI-23-B-3	Fecal Coliform	Unknown	2.1	Entire length	2011	No
Coallick Run	WVOMI-23-C	Fecal Coliform	Unknown	1.3	Entire length	2011	No
Willow Fork	WVOMI-23-E	Fecal Coliform	Unknown	3.7	Entire length	2011	No
		Iron	Unknown	3.7	Entire length	2011	No
Buck Run	WVOMI-23-E-1	Fecal Coliform	Unknown	2.6	Entire length	2011	No
Peach Fork	WVOMI-23-G	CNA-Biological	Unknown	0.4	Mouth to RM 0.4	2011	Yes
		Fecal Coliform	Unknown	1.5	Entire length	2011	No
UNT/Peach Fork RM 0.42	WVOMI-23-G-0.5	Fecal Coliform	Unknown	0.8	Entire length	2011	No
		Iron	Unknown	0.8	Entire length	2011	No
Gorrell Run	WVOMI-24	CNA-Biological	Unknown	4.4	Entire length	2011	No
		Fecal Coliform	Unknown	4.4	Entire length	2011	No
Indian Creek	WVOMI-29	CNA-Biological	Unknown	14.8	Entire length	2011	Yes
		Fecal Coliform	Unknown	14.8	Entire length	2011	No
Big Run	WVOMI-29-A	Fecal Coliform	Unknown	4.9	Entire length	2011	No
Walnut Fork	WVOMI-29-E	Fecal Coliform	Unknown	3.5	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
McElroy Creek	WVOMI-30	CNA-Biological	Unknown	22.1	Entire length	2011	Yes
		Fecal Coliform	Unknown	22.1	Entire length	2011	No
		Iron	Unknown	22.1	Entire length	2011	No
Flint Run	WVOMI-30-H	Fecal Coliform	Unknown	7.5	Entire length	2011	No
Little Flint Run	WVOMI-30-H-1	Fecal Coliform	Unknown	4.0	Entire length	2011	No
Talkington Fork	WVOMI-30-N	Fecal Coliform	Unknown	6.7	Entire length	2011	No
Robinson Fork	WVOMI-30-O	Fecal Coliform	Unknown	10.0	Entire length	2011	No
Big Battle Run	WVOMI-30-O-2	CNA-Biological	Unknown	5.1	Entire length	2011	No
		Fecal Coliform	Unknown	5.1	Entire length	2011	No
Pike Fork	WVOMI-30-P	Fecal Coliform	Unknown	5.8	Entire length	2011	No
Sycamore Fork	WVOMI-30-P-1	Fecal Coliform	Unknown	4.4	Entire length	2011	No
Camp Mistake Run	WVOMI-39	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Arnold Creek	WVOMI-40	Fecal Coliform	Unknown	10.9	Entire length	2011	No
		Iron	Unknown	10.9	Entire length	2011	No
Long Run	WVOMI-40-B	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Wilhelm Run	WVOMI-40-E	CNA-Biological	Unknown	3.5	Entire length	2011	Yes
		Fecal Coliform	Unknown	3.5	Entire length	2011	No
Claylick Run	WVOMI-40-F	Fecal Coliform	Unknown	3.7	Entire length	2011	No
Right Fork/Arnold Creek	WVOMI-40-I	CNA-Biological	Unknown	4.6	Entire length	2011	No
		Fecal Coliform	Unknown	4.6	Entire length	2011	No
Left Fork/Arnold Creek	WVOMI-40-J	Fecal Coliform	Unknown	4.9	Entire length	2011	No
UNT/Middle Island Creek RM 67.32	WVOMI-41.5	Fecal Coliform	Unknown	1.2	Entire length	2011	No
		Iron	Unknown	1.2	Entire length	2011	No
Bluestone Creek	WVOMI-43	Fecal Coliform	Unknown	7.6	Entire length	2011	No
Meathouse Fork	WVOMI-46	CNA-Biological	Unknown	19.7	Entire length	2011	Yes
		Fecal Coliform	Unknown	19.7	Entire length	2011	No
		Iron	Unknown	19.7	Entire length	2011	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Lick Run	WVOMI-46-B	Fecal Coliform	Unknown	4.5	Entire length	2011	No
		Iron	Unknown	4.5	Entire length	2011	No
Toms Fork	WVOMI-46-E	Iron	Unknown	9.3	Entire length	2011	No
Brushy Fork	WVOMI-46-H	Fecal Coliform	Unknown	4.1	Entire length	2011	No
		Iron	Unknown	4.1	Entire length	2011	No
Snake Run	WVOMI-46-I	Fecal Coliform	Unknown	1.8	Entire length	2011	No
Indian Fork	WVOMI-46-J	Fecal Coliform	Unknown	4.7	Entire length	2011	No
Big Isaac Creek	WVOMI-46-R	Fecal Coliform	Unknown	2.0	entire length	2011	No
Buckeye Creek	WVOMI-47	Fecal Coliform	Unknown	12.7	Entire length	2011	No
Buckeye Run	WVOMI-47-C	CNA-Biological	Unknown	5.4	Entire length	2011	Yes
		Fecal Coliform	Unknown	5.4	Entire length	2011	No
		Iron	Unknown	5.4	Entire length	2011	No
UNT/Buckeye Run RM 3.35	WVOMI-47-C-2.6	Fecal Coliform	Unknown	0.5	Entire length	2011	No
		Iron	Unknown	0.5	Entire length	2011	No
Buffalo Calf Fork	WVOMI-47-E	Fecal Coliform	Unknown	3.4	Entire length	2011	No

MIDDLE OHIO SOUTH WATERSHED - HUC# 05030202

1 Lake 278 acres 89 streams 586 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Ohio River (Middle South)	WVO-ms	Dioxin	Unknown	65.8	MP 238.0 to MP 172.2	2015	Yes
		Bacteria	Unknown	79.9	MP 265.7 to MP 203.2; 193.3-188.4; 184.7-172.2	2012	Yes
		Iron	Unknown	93.5	MP 265.7 to MP 172.2 (Entire length)	2018	Yes
Crooked Creek	WVO-20.5	Fecal Coliform	Unknown	8.6	Entire length	2011	No
		Iron	Unknown	8.6	Entire length	2011	No
Oldtown Creek	WVO-21	CNA-Biological	Unknown	19.4	Entire length	2011	Yes
		Fecal Coliform	Unknown	19.4	Entire length	2011	No
		Iron	Unknown	19.4	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Turkey Run	WVO-21-0.5A	CNA-Biological	Unknown	2.9	Entire length	2011	No
		Fecal Coliform	Unknown	2.9	Entire length	2011	No
		Iron	Unknown	2.9	Entire length	2011	No
Potter Creek	WVO-21-A	CNA-Biological	Unknown	3.6	Entire length	2011	No
Robinson Run	WVO-21-B	Fecal Coliform	Unknown	5.7	Entire length	2011	No
		Iron	Unknown	5.7	Entire length	2011	No
UNT/Robinson Run RM 2.42	WVO-21-B-0.9	CNA-Biological	Unknown	1.2	Entire length	2011	Yes
		Fecal Coliform	Unknown	1.2	Entire length	2011	No
		Iron	Unknown	1.2	Entire length	2011	Yes
UNT/Robinson Run RM 3.33	WVO-21-B-2	Fecal Coliform	Unknown	1.6	Entire length	2011	No
		Iron	Unknown	1.6	Entire length	2011	No
Trace Fork	WVO-21-C	Fecal Coliform	Unknown	4.4	Entire length	2011	No
		Iron	Unknown	4.4	Entire length	2011	No
Mill Run	WVO-22	CNA-Biological	Unknown	4.9	Entire length	2011	Yes
		Fecal Coliform	Unknown	4.9	Entire length	2011	No
		Iron	Unknown	4.9	Entire length	2011	No
Tenmile Creek	WVO-23	CNA-Biological	Unknown	9.6	Entire length	2011	Yes
		Fecal Coliform	Unknown	9.6	Entire length	2011	No
		Iron	Unknown	9.6	Entire length	2011	No
UNT/Tenmile Creek RM 4.13	WVO-23-B.5	Fecal Coliform	Unknown	0.6	Entire length	2011	No
UNT/Tenmile Creek RM 5.33	WVO-23-C	CNA-Biological	Unknown	1.6	Entire length	2011	No
		Iron	Unknown	1.6	Entire length	2011	No
Sliding Hill Creek	WVO-24	CNA-Biological	Unknown	4.8	Entire length	2011	Yes
		Fecal Coliform	Unknown	4.8	Entire length	2011	No
		Iron	Unknown	4.8	Entire length	2011	No
UNT/Sliding Hill Creek RM 1.25	WVO-24-A	CNA-Biological	Unknown	4.8	Entire length	2011	Yes
		Fecal Coliform	Unknown	4.8	Entire length	2011	No
		Iron	Unknown	4.8	Entire length	2011	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Broad Run	WVO-25	Fecal Coliform	Unknown	1.6	Entire length	2011	No
		Iron	Unknown	1.6	Entire length	2011	No
Little Broad Run	WVO-26	CNA-Biological	Unknown	4.3	Entire length	2011	No
		Fecal Coliform	Unknown	4.3	Entire length	2011	No
		Iron	Unknown	4.3	Entire length	2011	No
West Creek	WVO-27	Fecal Coliform	Unknown	6.0	Entire length	2011	No
		Iron	Unknown	6.0	Entire length	2011	No
Little Mill Creek	WVO-31	CNA-Biological	Unknown	10.0	Entire length	2011	Yes
		Fecal Coliform	Unknown	10.0	Entire length	2011	Yes
		Iron	Unknown	10.0	Entire length	2011	Yes
Mill Creek	WVO-32	CNA-Biological	Unknown	29.4	Entire length	2011	No
		Fecal Coliform	Unknown	29.4	Entire length	2011	No
		Iron	Unknown	29.4	Entire length	2011	No
Bar Run	WVO-32-C	CNA-Biological	Unknown	2.4	Entire length	2011	No
		Fecal Coliform	Unknown	2.4	Entire length	2011	No
		Iron	Unknown	2.4	Entire length	2011	No
Cow Run	WVO-32-D	CNA-Biological	Unknown	2.8	Entire length	2011	No
		Fecal Coliform	Unknown	2.8	Entire length	2011	No
		Iron	Unknown	2.8	Entire length	2011	No
Right Fork/Cow Run	WVO-32-D-1	Fecal Coliform	Unknown	1.5	Entire length	2011	No
		Iron	Unknown	1.5	Entire length	2011	No
Left Fork/Cow Run	WVO-32-D-2	CNA-Biological	Unknown	1.0	Entire length	2011	No
		Fecal Coliform	Unknown	1.0	Entire length	2011	No
		Iron	Unknown	1.0	Entire length	2011	No
Parchment Creek	WVO-32-H	CNA-Biological	Unknown	14.7	Entire length	2011	Yes
		Fecal Coliform	Unknown	14.7	Entire length	2011	Yes
		Iron	Unknown	14.7	Entire length	2011	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Grass Run	WVO-32-H-4	Fecal Coliform	Unknown	3.3	Entire length	2011	No
		Iron	Unknown	3.3	Entire length	2011	No
Cox Fork	WVO-32-H-6	CNA-Biological	Unknown	4.1	Entire length	2011	No
		Fecal Coliform	Unknown	4.1	Entire length	2011	No
		Iron	Unknown	4.1	Entire length	2011	No
Wolfe Creek	WVO-32-H-8	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
		Iron	Unknown	3.6	Entire length	2011	No
Sycamore Creek	WVO-32-K	CNA-Biological	Unknown	6.1	Entire length	2011	No
		Fecal Coliform	Unknown	6.1	Entire length	2011	No
		Iron	Unknown	6.1	Entire length	2011	No
Left Fork/Sycamore Creek	WVO-32-K-1	CNA-Biological	Unknown	1.0	Entire length	2011	No
		Fecal Coliform	Unknown	1.0	Entire length	2011	No
		Iron	Unknown	1.0	Entire length	2011	No
Tug Fork	WVO-32-L	Fecal Coliform	Unknown	11.9	Entire length	2011	No
		Iron	Unknown	11.9	Entire length	2011	No
Bear Fork	WVO-32-L-4.5	Fecal Coliform	Unknown	1.0	Entire length	2011	No
Grasslick Creek	WVO-32-L-7	CNA-Biological	Unknown	13.3	Entire length	2011	Yes
		Fecal Coliform	Unknown	13.3	Entire length	2011	No
		Iron	Unknown	13.3	Entire length	2011	No
Stonelick Creek	WVO-32-L-7-B	Fecal Coliform	Unknown	5.1	Entire length	2011	No
Bear Fork	WVO-32-L-8	CNA-Biological	Unknown	6.7	Entire length	2011	No
		Fecal Coliform	Unknown	6.7	Entire length	2011	No
Laurel Run	WVO-32-L-8-B	Fecal Coliform	Unknown	2.7	Entire length	2011	No
Elk Fork	WVO-32-M	CNA-Biological	Unknown	15.4	Entire length	2011	No
		Fecal Coliform	Unknown	15.4	Entire length	2011	No
		Iron	Unknown	15.4	Entire length	2011	No
Elk Fork Lake	WVO-32-M-(L1)	PCBs	Unknown	278.0	Entire length	2021	Yes

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Little Mill Creek	WVO-32-N	CNA-Biological	Unknown	11.1	Entire length	2011	No
		Fecal Coliform	Unknown	11.1	Entire length	2011	No
		Iron	Unknown	11.1	Entire length	2011	No
Joes Run	WVO-32-N-2	Fecal Coliform	Unknown	1.0	Entire length	2011	No
		Iron	Unknown	1.0	Entire length	2011	No
Frozencamp Creek	WVO-32-N-3	CNA-Biological	Unknown	3.0	Entire length	2011	No
		Fecal Coliform	Unknown	3.0	Entire length	2011	No
		Iron	Unknown	3.0	Entire length	2011	No
Big Run	WVO-32-N-4	Fecal Coliform	Unknown	1.7	Entire length	2011	No
		Iron	Unknown	1.7	Entire length	2011	No
Right Fork/Big Run	WVO-32-N-4-B	Fecal Coliform	Unknown	3.2	Entire length	2011	No
Left Fork/Big Run	WVO-32-N-4-C	Fecal Coliform	Unknown	3.2	Entire length	2011	No
Little Creek	WVO-32-N-5	CNA-Biological	Unknown	4.8	Entire length	2011	No
		Fecal Coliform	Unknown	4.8	Entire length	2011	No
Poplar Fork	WVO-32-N-5-B	Fecal Coliform	Unknown	1.3	Entire length	2011	No
Buffalo Creek	WVO-32-N-6	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
Spring Creek	WVO-33	CNA-Biological	Unknown	2.5	Entire length	2011	Yes
		Fecal Coliform	Unknown	2.5	Entire length	2011	No
Cedar Run	WVO-34	CNA-Biological	Unknown	3.4	Entire length	2011	No
		Fecal Coliform	Unknown	3.4	Entire length	2011	No
Sandy Creek	WVO-36	CNA-Biological	Unknown	22.0	Entire length	2011	Yes
		Fecal Coliform	Unknown	22.0	Entire length	2011	Yes
		Iron	Unknown	22.0	Entire length	2011	Yes
Straight Fork	WVO-36-C	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Crooked Fork	WVO-36-D	CNA-Biological	Unknown	6.1	Entire length	2011	No
		Fecal Coliform	Unknown	6.1	Entire length	2011	No
		Iron	Unknown	6.1	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Trace Fork	WVO-36-G	CNA-Biological	Unknown	6.4	Entire length	2011	No
		Fecal Coliform	Unknown	6.4	Entire length	2011	No
Beatty Run	WVO-36-H	CNA-Biological	Unknown	3.4	Entire length	2011	No
		Fecal Coliform	Unknown	3.4	Entire length	2011	No
		Iron	Unknown	3.4	Entire length	2011	No
Right Fork/Sandy Creek	WVO-36-I	CNA-Biological	Unknown	11.7	Entire length	2011	No
		Fecal Coliform	Unknown	11.7	Entire length	2011	No
		Iron	Unknown	11.7	Entire length	2011	No
Biglick Run	WVO-36-I-4	Fecal Coliform	Unknown	2.7	Entire length	2011	No
Fallentimber Run	WVO-36-I-10	Fecal Coliform	Unknown	2.8	Entire length	2011	No
Cabin Run	WVO-36-I-12	Fecal Coliform	Unknown	1.7	Entire length	2011	No
		Iron	Unknown	1.7	Entire length	2011	No
Left Fork/Sandy Creek	WVO-36-J	CNA-Biological	Unknown	16.3	Entire length	2011	Yes
		Fecal Coliform	Unknown	16.3	Entire length	2011	No
		Iron	Unknown	16.3	Entire length	2011	No
Copper Fork	WVO-36-J-1	CNA-Biological	Unknown	4.8	Entire length	2011	No
		Fecal Coliform	Unknown	4.8	Entire length	2011	No
		Iron	Unknown	4.8	Entire length	2011	No
Turkey Fork	WVO-36-J-3	CNA-Biological	Unknown	5.5	Entire length	2011	No
		Fecal Coliform	Unknown	5.5	Entire length	2011	No
Nesselroad Run	WVO-36-J-5	CNA-Biological	Unknown	7.6	Entire length	2011	Yes
		Fecal Coliform	Unknown	7.6	Entire length	2011	No
		Iron	Unknown	7.6	Entire length	2011	No
Redbush Run	WVO-36-J-5-C	Fecal Coliform	Unknown	2.1	Entire length	2011	No
		Iron	Unknown	2.1	Entire length	2011	No
Maulecamp Run	WVO-36-J-5-E	Fecal Coliform	Unknown	3.1	Entire length	2011	No
		Iron	Unknown	3.1	Entire length	2011	No

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WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Lockhart Fork	WVO-36-J-8	Fecal Coliform	Unknown	3.0	Entire length	2011	No
		Iron	Unknown	3.0	Entire length	2011	No
Little Sandy Creek	WVO-38	Fecal Coliform	Unknown	7.8	Entire length	2011	No
Roadfork Run	WVO-38-A	Fecal Coliform	Unknown	4.2	Entire length	2011	No
		Iron	Unknown	4.2	Entire length	2011	No
Washington Run	WVO-41	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
		Iron	Unknown	3.6	Entire length	2011	No
Pond Creek	WVO-43	CNA-Biological	Unknown	16.0	Entire length	2011	Yes
		Fecal Coliform	Unknown	16.0	Entire length	2011	No
		Iron	Unknown	16.0	Entire length	2011	No
Little Pond Creek	WVO-43-D	Fecal Coliform	Unknown	7.9	Entire length	2011	No
		Iron	Unknown	7.9	Entire length	2011	No
Jesse Run	WVO-43-D-2	CNA-Biological	Unknown	0.6	Entire length	2011	No
		Iron	Unknown	0.6	Entire length	2011	No
UNT/Jesse Run RM 0.44	WVO-43-D-2-0.5A	Iron	Unknown	1.0	Entire length	2011	No
Jerrys Run	WVO-43-H	Fecal Coliform	Unknown	3.1	Entire length	2011	No
		Iron	Unknown	3.1	Entire length	2011	No
Joshus Fork	WVO-43-K	Fecal Coliform	Unknown	1.7	Entire length	2011	No
		Iron	Unknown	1.7	Entire length	2011	No
South Fork/Lee Creek	WVO-44-A	CNA-Biological	Unknown	11.2	Entire length	2011	Yes
		Fecal Coliform	Unknown	11.2	Entire length	2011	No
		Iron	Unknown	11.2	Entire length	2011	No
Middle Fork/South Fork/Lee Creek	WVO-44-A-1	Fecal Coliform	Unknown	3.2	Entire length	2011	No
Willow Run	WVO-44-A-2	Fecal Coliform	Unknown	2.2	Entire length	2011	No

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
North Fork/Lee Creek	WVO-44-B	CNA-Biological	Unknown	20.0	Entire length	2011	Yes
		Fecal Coliform	Unknown	20.0	Entire length	2011	No
		Iron	Unknown	20.0	Entire length	2011	No
Woodyards Run	WVO-44-B-2	Fecal Coliform	Unknown	3.1	Entire length	2011	No
		Iron	Unknown	3.1	Entire length	2011	No
Gunners Run	WVO-44-B-4	CNA-Biological	Unknown	1.6	Entire length	2011	No
		Fecal Coliform	Unknown	1.6	Entire length	2011	No
Sandy Creek	WVO-46	CNA-Biological	Unknown	5.3	Entire length	2011	No
		Fecal Coliform	Unknown	5.3	Entire length	2011	No
		Iron	Unknown	5.3	Entire length	2011	No
Vaughts Run	WVO-46-A	CNA-Biological	Unknown	3.9	Entire length	2011	No
		Fecal Coliform	Unknown	3.9	Entire length	2011	No
		Iron	Unknown	3.9	Entire length	2011	No
UNT/Sandy Creek RM 4.97	WVO-46-J	CNA-Biological	Unknown	1.7	Entire length	2011	Yes
		Fecal Coliform	Unknown	1.7	Entire length	2011	No
Pond Run	WVO-48	CNA-Biological	Unknown	6.8	Entire length	2011	No
		Fecal Coliform	Unknown	6.8	Entire length	2011	No
		Iron	Unknown	6.8	Entire length	2011	No
Little Pond Run	WVO-48-A	CNA-Biological	Unknown	2.8	Entire length	2011	No
		Fecal Coliform	Unknown	2.8	Entire length	2011	No
		Iron	Unknown	2.8	Entire length	2011	No
Briscoe Run	WVO-49	CNA-Biological	Unknown	2.8	Entire length	2011	Yes
		Fecal Coliform	Unknown	2.8	Entire length	2011	No
		Iron	Unknown	2.8	Entire length	2011	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Big Run	WVO-50	CNA-Biological	Unknown	10.1	Entire length	2011	Yes
		Fecal Coliform	Unknown	10.1	Entire length	2011	No
Williams Creek	WVO-50-A	Fecal Coliform	Unknown	3.4	Entire length	2011	No
		Iron	Unknown	3.4	Entire length	2011	No
Plum Run	WVO-50-B	CNA-Biological	Unknown	2.6	Entire length	2011	No
		Fecal Coliform	Unknown	2.6	Entire length	2011	No
Hogland Run	WVO-50-D	CNA-Biological	Unknown	2.4	Entire length	2011	No
		Fecal Coliform	Unknown	2.4	Entire length	2011	No
		Iron	Unknown	2.4	Entire length	2011	No

POTOMAC DIRECT DRAINS WATERSHED - HUC# 02070004

8 streams 67 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Rattlesnake Run	WVP-2	CNA-Biological	Unknown	4.4	Entire length	2021	Yes
Rockymarsh Run	WVP-3	CNA-Biological	Unknown	4.7	Entire length	2021	Yes
		Fecal Coliform	Unknown	4.7	Entire length	2021	No
UNT/Rockymarsh Run RM 3.99	WVP-3-B	Fecal Coliform	Unknown	2.9	Entire length	2021	No
Opequon Creek	WVP-4	Nitrite (trout)	Unknown	30.7	Entire length	2021	Yes
UNT/Opequon Creek RM 10.21	WVP-4-C.4	CNA-Biological	Unknown	1.0	Entire length	2021	Yes
Roaring Run	WVP-9-B-1	CNA-Biological	Unknown	2.9	Entire length	2021	Yes
Middle Fork/Sleepy Creek	WVP-9-E	CNA-Biological	Unknown	10.2	RM 1.5 to HW	2021	Yes
Warm Spring Run	WVP-10	CNA-Biological	Unknown	10.3	Entire length	2021	Yes

TUG FORK WATERSHED - HUC# 05070201

37 streams 348 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Tug Fork	WVBST	CNA-Biological	Unknown	103.4	RM 51.6 to HW	2016	Yes
		Fecal Coliform	Unknown	155.0	Entire length	2021	Yes
Mill Creek	WVBST-1	CNA-Biological	Unknown	8.7	Entire length	2021	Yes
Lost Creek	WVBST-7	CNA-Biological	Unknown	4.5	Entire length	2021	Yes
Silver Creek	WVBST-16	CNA-Biological	Unknown	2.5	Entire length	2016	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Parsley Big Branch	WVBST-23	CNA-Biological	Unknown	2.2	Entire length	2021	Yes
Left Fork/Right Fork/Trace Fork	WVBST-24-K-4-A	Selenium AQ	Unknown	1.9	Entire length	2021	Yes
UNT/Oldfield Branch RM 0.46	WVBST-24-T-1	Selenium AQ	Unknown	0.6	Entire length	2021	Yes
Slick Rock Branch	WVBST-24-AA	Selenium AQ	Unknown	1.4	Entire length	2021	Yes
Sulphur Creek	WVBST-41	CNA-Biological	Unknown	1.7	Entire length	2016	Yes
Ben Creek	WVBST-52	Selenium AQ	Unknown	8.2	Entire length	2021	Yes
Bull Creek	WVBST-57	Fecal Coliform	Unknown	4.9	Entire length	2021	Yes
Left Fork/Bull Creek	WVBST-57-B	Fecal Coliform	Unknown	2.0	Entire length	2021	Yes
Greenbrier Fork	WVBST-60-A	CNA-Biological	Unknown	3.5	Entire length	2016	Yes
Horse Creek	WVBST-63	CNA-Biological	Unknown	4.6	Entire length	2021	Yes
Dry Fork	WVBST-70	CNA-Biological	Unknown	34.5	Entire length	2021	Yes
		Fecal Coliform	Unknown	34.5	Entire length	2021	Yes
Grapevine Branch	WVBST-70-F	CNA-Biological	Unknown	1.8	Entire length	2016	Yes
Bradshaw Creek	WVBST-70-M	Fecal Coliform	Unknown	5.5	Entire length	2021	Yes
Wolfpen Branch	WVBST-70-M-3	CNA-Biological	Unknown	1.6	Entire length	2016	Yes
Little Slate Creek	WVBST-70-N	Fecal Coliform	Unknown	6.8	Entire length	2021	Yes
Jacobs Fork	WVBST-70-W	Fecal Coliform	Unknown	10.6	Entire length	2021	Yes
Mountain Fork	WVBST-70-W-1-A	CNA-Biological	Unknown	3.6	Entire length	2016	Yes
Middle Fork/Big Creek	WVBST-70-W-1-G	CNA-Biological	Unknown	1.6	Entire length	2021	Yes
Beech Fork	WVBST-70-AA	CNA-Biological	Unknown	1.0	entire length	2021	Yes
Clear Fork	WVBST-76	Fecal Coliform	Unknown	10.5	Entire length	2021	Yes
Spice Creek	WVBST-78	CNA-Biological	Unknown	5.7	Entire length	2021	No
Badway Branch	WVBST-78-G	CNA-Biological	Unknown	1.3	Entire length	2016	Yes
Davy Branch	WVBST-85	CNA-Biological	Unknown	4.1	Entire length	2021	No
		Fecal Coliform	Unknown	4.1	Entire length	2021	Yes
Upper Shannon Branch	WVBST-95	CNA-Biological	Unknown	2.4	Entire length	2016	Yes
Browns Creek	WVBST-98	CNA-Biological	Unknown	5.1	Entire length	2021	No
		Fecal Coliform	Unknown	5.1	Entire length	2021	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Puncheoncamp Branch	WVBST-98-A	CNA-Biological	Unknown	3.0	Entire length	2021	No
Trail Fork	WVBST-98-B	Fecal Coliform	Unknown	2.4	Entire length	2021	Yes
Elkhorn Creek	WVBST-99	Iron (trout) AQ	Unknown	22.7	Entire length	2021	Yes
North Fork/Elkhorn Creek	WVBST-99-L	Fecal Coliform	Unknown	8.0	Entire length	2021	Yes
Windmill Gap Branch	WVBST-99-L-4	Fecal Coliform	Unknown	2.8	Entire length	2021	Yes
Rock Narrows Branch	WVBST-103	CNA-Biological	Unknown	1.7	Entire length	2016	Yes
Sandlick Creek	WVBST-109	Selenium AQ	Unknown	5.3	Entire length	2021	Yes
Little Creek	WVBST-120	Fecal Coliform	Unknown	4.2	Entire length	2021	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP D							
GREENBRIER WATERSHED - HUC# 05050003						*3 streams*	*110 miles*
Greenbrier River	WVKNG	CNA-Algae	Unknown	102.8	Mouth to RM 102.78 (Beaver Ck)	2022	No
UNT/Stony Run RM 1.12	WVKNG-22-E-1-A.7-2	CNA-Biological	Unknown	1.5	Entire length	2022	Yes
Howard Creek	WVKNG-25	CNA-Biological	Unknown	6.2	Mouth to RM 6.2	2022	No
LITTLE KANAWHA WATERSHED - HUC# 05030203						*26 streams*	*364 miles*
Little Kanawha River	WVLK	Fecal Coliform	Unknown	132.6	Mouth to RM 132.6 (Burnsville	2017	Yes
		pH	Unknown	6.9	RM 162.1 to HW	2017	Yes
Walker Creek	WVLK-10	CNA-Biological	Unknown	15.6	Entire length	2022	Yes
Tanner Run	WVLK-31-X	Fecal Coliform	Unknown	4.4	Entire length	2022	Yes
Leading Creek	WVLK-40	CNA-Biological	Unknown	5.6	Mouth to RM 5.6	2017	Yes
Tanner Creek	WVLK-66	CNA-Biological	Unknown	15.3	Entire length	2017	Yes
Butchers Run	WVLK-72-M	CNA-Biological	Unknown	2.5	Entire length	2022	Yes
Sand Fork	WVLK-75-N-5	CNA-Biological	Unknown	5.1	Entire length	2022	Yes
Copen Run	WVLK-90	CNA-Biological	Unknown	5.2	Entire length	2022	No
Right Fork/Little Kanawha River	WVLK-115	pH	Unknown	13.7	RM 0.4 to HW	2017	Yes
UNT/Little Kanawha River RM 165.34	WVLK-130.5	pH	Unknown	2.6	Entire length	2017	Yes
Getout Run	WVLK-131	pH	Unknown	2.5	Entire length	2017	Yes
HUGHES RIVER SUBWATERSHED							
Hughes River	WVLKH	PCBs	Unknown	13.8	Entire length	2017	Yes
Goose Creek	WVLKH-4	CNA-Biological	Unknown	10.0	Mouth to RM 10.0	2017	Yes
South Fork/Hughes River	WVLKH-9	CNA-Biological	Unknown	31.0	RM 1.9 to RM 32.0	2017	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Indian Creek	WVLKH-9-J	CNA-Biological	Unknown	7.5	Mouth to RM 7.5	2017	Yes
Bone Creek	WVLKH-9-X	CNA-Biological	Unknown	7.8	entire length	2022	Yes
Middle Fork/South Fork/Hughes	WVLKH-9-AA	CNA-Biological	Unknown	11.0	Entire length	2017	Yes
Beech Run	WVLKH-10-R-4-A	CNA-Biological	Unknown	1.3	Entire length	2022	Yes
STEER CREEK SUBWATERSHED							
Rush Run	WVLKS-4	CNA-Biological	Unknown	3.0	Entire length	2017	Yes
Right Fork/Steer Creek	WVLKS-9	CNA-Biological	Unknown	25.4	Entire length	2017	Yes
Left Fork/Steer Creek	WVLKS-10	CNA-Biological	Unknown	24.5	Entire length	2017	Yes
White Oak Run	WVLKS-10-D	CNA-Biological	Unknown	1.9	Entire length	2017	Yes
Steer Run	WVLKS-10-E	CNA-Biological	Unknown	5.1	Entire length	2017	Yes
Bender Run	WVLKS-10-P	CNA-Biological	Unknown	2.5	Entire length	2017	Yes
WEST FORK SUBWATERSHED							
Laurel Run	WVLKW-15-F	CNA-Biological	Unknown	5.2	Entire length	2022	Yes
Sang Run	WVLKW-15-I-9	CNA-Biological	Unknown	1.6	Entire length	2022	No

LOWER NEW WATERSHED - HUC# 05050004

3 stream 14 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Fern Creek	WVKN-11	pH	Unknown	6.2	Entire length	2022	Yes
Hamilton Branch	WVKN-22-D-1	CNA-Biological	Unknown	2.9	Entire length	2022	No
Bowyer Creek	WVKN-26-M	CNA-Biological	Unknown	4.4	Entire length	2022	No

MONONGAHELA WATERSHED - HUC# 05020003

18 streams 135 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Monongahela River	WVM	Fecal Coliform	Unknown	37.5	Entire length	2017	Yes
UNT/Camp Run RM 0.79	WVM-2.1-A	CNA-Biological	Unknown	1.5	Entire length	2012	Yes
Dillan Creek	WVM-8-G	pH	Unknown	5.4	Entire length	2012	No
UNT/Kanes Creek RM 2.36	WVM-8-I-0.9	Aluminum (d)	Unknown	0.6	Entire length	2012	No
		pH	Unknown	0.6	Entire length	2012	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Kanes Creek RM 2.49	WVM-8-I-1	Aluminum (d)	Unknown	0.8	Entire length	2012	No
		Iron	Unknown	0.8	Entire length	2012	Yes
		pH	Unknown	0.8	Entire length	2012	Yes
UNT/Deckers Creek RM 18.48	WVM-8-J	Lead	Unknown	1.5	Entire length	2012	Yes
Cobun Creek	WVM-9	pH	Unknown	2.4	RM 7.9 to HW	2012	Yes
Indian Creek	WVM-17	CNA-Biological	Unknown	9.4	Entire length	2012	Yes
Grassy Run	WVM-19-E	CNA-Biological	Unknown	2.5	Entire length	2012	Yes
Paw Paw Creek	WVM-22	CNA-Biological	Unknown	14.4	Entire length	2012	Yes
Buffalo Creek	WVM-23	CNA-Biological	Unknown	30.2	Entire length	2012	Yes
UNT/Finchs Run RM 1.15	WVM-23-B-1	CNA-Biological	Unknown	1.6	Entire length	2012	Yes
UNT/Bethel Run RM 0.81	WVM-23-E-0.5-A	CNA-Biological	Unknown	1.7	Entire length	2012	No
Mahan Run	WVM-23-L	CNA-Biological	Unknown	3.6	Entire length	2012	Yes
Pyles Fork	WVM-23-O	CNA-Biological	Unknown	11.0	Entire length	2012	Yes
Campbell Run	WVM-23-O-7	CNA-Biological	Unknown	3.0	Entire length	2012	Yes
Dents Run	WVM-23-P	CNA-Biological	Unknown	5.1	Entire length	2012	Yes
Whetstone Run	WVM-23-Q	CNA-Biological	Unknown	2.6	Entire length	2012	Yes

UPPER NEW WATERSHED - HUC# 05050002

2 Lakes 2110 acres 4 streams 81 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Bluestone Lake	WVKN-(L1)	PCBs	Unknown	2040.0	Entire length	2017	Yes
East River	WVKN-60	CNA-Biological	Unknown	6.9	RM 16.0 to HW	2022	Yes
BLUESTONE RIVER SUBWATERSHED							
Bluestone River	WVKNB	PCBs	Unknown	67.1	Entire length	2017	Yes
UNT/Jumping Branch RM 2.48	WVKNB-3-C-1-E	CNA-Biological	Unknown	0.9	Entire length	2022	No
Kee Reservoir	WVKNB-12-J-2-(L1)	PCBs	Unknown	70.0	Entire length	2017	Yes
Widemouth Creek	WVKNB-28	Iron (trout) AQ	Unknown	6.6	Entire length	2022	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?

HYDROLOGIC GROUP E

BIG SANDY WATERSHED - HUC# 05070204

11 streams 62 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size	Reach Description	Projected TMDL Year	2008 list?
Big Sandy River	WVBS	Iron	Unknown	26.6	Entire length	2018	Yes
Miller Creek	WVBS-1	CNA-Biological	Unknown	1.7	Entire length	2018	Yes
Cedar Run	WVBS-3	CNA-Biological	Unknown	1.5	Mouth to HW (RM 1.5)	2018	Yes
Whites Creek	WVBS-5	CNA-Biological	Unknown	8.8	Entire length	2018	Yes
Gragston Creek	WVBS-6	CNA-Biological	Unknown	6.5	Entire length	2018	Yes
Elijah Creek	WVBS-7	CNA-Biological	Unknown	2.2	Entire length	2018	Yes
Gilkerson Branch	WVBS-7-B	CNA-Biological	Unknown	1.2	Entire length	2018	Yes
Hurricane Creek	WVBS-8	CNA-Biological	Unknown	7.9	Entire length	2018	Yes
Sugar Branch	WVBS-8-0.7A	CNA-Biological	Unknown	0.8	Entire length	2018	Yes
Tabor Creek	WVBS-10	CNA-Biological	Unknown	3.8	RM 1.0 to RM 4.8	2018	Yes
Redhead Branch	WVBS-13	CNA-Biological	Unknown	0.7	Entire length	2018	Yes

CACAPON WATERSHED - HUC# 02070003

6 streams 39 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size	Reach Description	Projected TMDL Year	2008 list?
Hiett Run	WVPC-7-D	CNA-Biological	Unknown	5.7	Entire length	2018	Yes
UNT/Bearwallow Creek RM 0.98	WVPC-7-F-1-B	CNA-Biological	Unknown	3.4	Entire length	2018	Yes
UNT/Mill Branch RM 1.99	WVPC-12-B	CNA-Biological	Unknown	2.6	Entire length	2023	No
Upper Cove Run	WVPC-24-K	CNA-Biological	Unknown	1.2	Mouth to RM 1.2	2018	Yes
Dawson Run	WVP-18.5	CNA-Biological	Unknown	2.9	Entire length	2023	Yes
Little Cacapon River	WVP-19	CNA-Biological	Unknown	23.3	RM 5.7 to HW	2018	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
DUNKARD WATERSHED - HUC# 05020005						*4 streams*	*20 miles*
Miracle Run	WVM-1-E	CNA-Biological	Mining	7.6	Entire length	2013	Yes
Building Run	WVM-1-E-5	CNA-Biological	Mining	1.3	Entire length	2013	Yes
West Virginia Fork/Dunkard	WVM-1-F	CNA-Biological	Mining	5.8	Entire length	2013	Yes
South Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-7	CNA-Biological	Mining	4.8	Entire length	2013	Yes
LOWER OHIO WATERSHED - HUC# 05090101						*14 streams*	*132 miles*
Ohio River (Lower)	WVO-lo	Bacteria	Unknown	48.8	MP 317.3 to MP 306.4; 303.6-265.7	2012	Yes
		Iron	Unknown	51.6	MP 317.3 to MP 265.7 (Entire length)	2018	Yes
Fourpole Creek	WVO-3	CNA-Biological	Unknown	11.7	Entire length	2018	Yes
Sevenmile Creek	WVO-6	CNA-Biological	Unknown	5.9	Entire length	2018	Yes
Ninemile Creek	WVO-7	CNA-Biological	Unknown	7.0	Mouth to RM 7.0	2018	Yes
Guyan Creek	WVO-9	CNA-Biological	Unknown	12.5	Mouth to RM 12.5	2018	Yes
Spurlock Creek	WVO-9-A	CNA-Biological	Unknown	5.5	Entire length	2018	Yes
McCowan Branch	WVO-9-B	CNA-Biological	Unknown	2.5	Entire length	2018	Yes
Rocky Fork	WVO-10-A	CNA-Biological	Unknown	2.7	Entire length	2018	Yes
Mud Run	WVO-10-D	CNA-Biological	Unknown	1.5	Mouth to RM 1.5	2018	Yes
Sixteenmile Creek	WVO-11	CNA-Biological	Unknown	13.2	Mouth to RM 13.2	2018	Yes
Stonecoal Run	WVO-11-A	CNA-Biological	Unknown	2.5	Entire length	2018	Yes
Crab Creek	WVO-13	CNA-Biological	Unknown	6.7	Mouth to RM 6.7	2018	Yes
Mud Run	WVO-13-A	CNA-Biological	Unknown	4.4	Entire length	2018	Yes
Middle Fork/Crab Creek	WVO-13-D	CNA-Biological	Unknown	4.3	Entire length	2018	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
TWELVEPOLE WATERSHED - HUC# 05090102						*36 streams 209 miles*	
Twelvepole Creek	WVO-2	CNA-Biological	Unknown	19.1	RM 13.9 to HW	2018	Yes
		Fecal Coliform	Unknown	33.0	Entire length	2018	Yes
		Iron	Unknown	33.0	Entire length	2018	Yes
Krout Creek	WVO-2-0.1A	CNA-Biological	Unknown	2.4	Entire length	2018	Yes
UNT/Twelvepole Creek RM 5.72	WVO-2-0.8A	CNA-Biological	Unknown	2.0	Entire length	2018	Yes
Buffalo Creek	WVO-2-C	CNA-Biological	Unknown	6.6	Entire length	2018	Yes
Camp Creek	WVO-2-G	CNA-Biological	Unknown	3.4	Entire length	2018	Yes
Right Fork/Camp Creek	WVO-2-G-1	CNA-Biological	Unknown	2.6	Entire length	2018	Yes
Beech Fork	WVO-2-H	CNA-Biological	Unknown	20.2	Mouth to RM 3.7 (dam) and Lake backwaters to HW	2018	Yes
Rubens Branch	WVO-2-H-3	CNA-Biological	Unknown	1.3	RM 0.7 to HW	2018	Yes
Long Branch	WVO-2-H-7	CNA-Biological	Unknown	3.6	Entire length	2018	Yes
Butler Branch	WVO-2-H-8	CNA-Biological	Unknown	1.8	Entire length	2018	Yes
Lynn Creek	WVO-2-I	CNA-Biological	Unknown	3.0	Entire length	2023	Yes
Shoal Branch	WVO-2-M	CNA-Biological	Unknown	1.1	Entire length	2018	Yes
Left Fork/Wilson Creek	WVO-2-N-1	CNA-Biological	Unknown	2.2	Entire length	2018	Yes
Toms Creek	WVO-2-O	CNA-Biological	Unknown	2.6	Entire length	2018	Yes
West Fork/Twelvepole Creek	WVO-2-P	CNA-Biological	Unknown	58.4	Entire length	2018	Yes
Big Branch	WVO-2-P-1	CNA-Biological	Unknown	2.2	Entire length	2018	Yes
Trace Fork	WVO-2-P-4	CNA-Biological	Unknown	4.5	Entire length	2018	Yes
Billy Branch	WVO-2-P-12	CNA-Biological	Unknown	2.8	Entire length	2018	Yes
Wells Branch	WVO-2-P-19	CNA-Biological	Unknown	1.7	Entire length	2018	Yes
Moses Fork	WVO-2-P-21	CNA-Biological	Unknown	3.7	Mouth to RM 3.7	2018	Yes
Right Fork/Moses Fork	WVO-2-P-21-C	CNA-Biological	Unknown	1.7	Entire length	2018	Yes
Breeden Creek	WVO-2-P-36	CNA-Biological	Unknown	3.2	Entire length	2018	Yes
Moses Fork	WVO-2-P-43	CNA-Biological	Unknown	2.5	Entire length	2018	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
East Fork/Twelvepole Creek	WVO-2-Q	CNA-Biological	Unknown	9.4	RM 4.4 to RM 10.5 (East Lynn Dam) and RM 35 to HW	2018	Yes
Lynn Creek	WVO-2-Q-9	CNA-Biological	Unknown	1.9	Entire length	2018	Yes
Rich Creek	WVO-2-Q-14	Iron	Unknown	3.5	Entire length	2018	Yes
Cove Creek	WVO-2-Q-17	CNA-Biological	Unknown	4.8	Entire length	2018	Yes
Kiah Creek	WVO-2-Q-18	CNA-Biological	Unknown	7.9	RM 3.9 to 11.8	2018	Yes
Parker Branch	WVO-2-Q-18-D	CNA-Biological	Unknown	1.4	Mouth to RM 1.4 (below impoundment)	2018	Yes
Rollem Fork	WVO-2-Q-18-E	CNA-Biological	Unknown	0.9	Mouth to RM 0.9	2018	Yes
Frances Creek	WVO-2-Q-18-F	CNA-Biological	Unknown	3.6	Entire length	2023	No
Copley Trace Branch	WVO-2-Q-18-G	CNA-Biological	Unknown	1.5	Mouth to RM 1.5	2018	Yes
Jims Branch	WVO-2-Q-18-H	CNA-Biological	Unknown	0.9	Mouth to RM 0.9	2023	No
Maynard Branch	WVO-2-Q-23	CNA-Biological	Unknown	0.2	Mouth to RM 0.2	2018	Yes
Honey Branch	WVO-2-Q-29	CNA-Biological	Unknown	0.2	Mouth to RM 0.2 (below impoundment)	2018	Yes
Right Fork/Cub Branch	WVO-2-Q-31-A	CNA-Biological	Unknown	0.6	Mouth to RM 0.6	2018	Yes

UPPER GUYANDOTTE WATERSHED - HUC# 05070101 *1 Lake 630 acres 47 streams 200 miles*

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
R D Bailey Lake	WVOG-(L1)	PCBs	Unknown	630.0	Entire length	2018	Yes
Island Creek	WVOG-65	CNA-Biological	Unknown	18.1	Entire length	2018	Yes
Rockhouse Branch	WVOG-65-B-1-F	CNA-Biological	Unknown	2.3	Entire length	2018	Yes
Whitman Creek	WVOG-65-B-2	CNA-Biological	Unknown	6.8	Entire length	2018	Yes
Curry Branch	WVOG-65-B-5	CNA-Biological	Unknown	0.9	Entire length	2018	Yes
Mill Creek	WVOG-65-C	CNA-Biological	Unknown	1.6	Entire length	2018	Yes
Pine Creek	WVOG-65-H	CNA-Biological	Unknown	6.4	Entire length	2023	Yes
Right Fork/Pine Creek	WVOG-65-H-1	CNA-Biological	Unknown	2.9	Entire length	2018	Yes
Cow Creek	WVOG-65-J	CNA-Biological	Unknown	5.8	Mouth to RM 5.8	2018	Yes
Lower Dempsey Branch	WVOG-65-L.5	CNA-Biological	Unknown	1.1	Entire length	2018	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Dingess Run	WVOG-68	CNA-Biological	Unknown	7.4	Entire length	2023	No
Rum Creek	WVOG-70	CNA-Biological	Unknown	8.8	Entire length	2023	Yes
		Selenium AQ	Unknown	8.8	Entire length	2023	Yes
Right Hand Fork/Rum Creek	WVOG-70-A	CNA-Biological	Unknown	4.0	Entire length	2018	Yes
Burgess Branch	WVOG-70-A-1	CNA-Biological	Unknown	1.5	Entire length	2023	Yes
Camp Branch	WVOG-71.5	CNA-Biological	Unknown	1.9	Entire length	2018	Yes
Right Fork/Buffalo Creek	WVOG-75-A	CNA-Biological	Unknown	8.1	Entire length	2018	Yes
Perry Branch	WVOG-75-A-1	CNA-Biological	Unknown	1.4	Entire length	2023	Yes
Robinette Branch	WVOG-75-D	CNA-Biological	Unknown	1.5	Entire length	2018	Yes
Middle Fork/Buffalo Creek	WVOG-75-L	CNA-Biological	Unknown	2.2	Entire length	2018	Yes
Paynter Branch	WVOG-76-M	CNA-Biological	Unknown	2.5	Entire length	2018	Yes
Lefthand Fork/Rockhouse Creek	WVOG-77-D	CNA-Biological	Unknown	2.4	Entire length	2018	Yes
Right Fork/Sandlick Creek	WVOG-78-A	CNA-Biological	Unknown	1.3	Entire length	2018	Yes
Spice Creek	WVOG-82	CNA-Biological	Unknown	1.8	Entire length	2018	Yes
Stafford Branch	WVOG-88	CNA-Biological	Unknown	1.4	Entire length	2018	Yes
Browning Fork	WVOG-89-B-1	CNA-Biological	Unknown	4.4	Entire length	2018	Yes
Little Huff Creek	WVOG-92	CNA-Biological	Unknown	7.9	Mouth to RM 7.9	2018	Yes
Little Cub Creek	WVOG-92-B	CNA-Biological	Unknown	2.8	Entire length	2018	Yes
Suke Creek	WVOG-92-M	CNA-Biological	Unknown	2.4	Entire length	2018	Yes
Long Branch	WVOG-97	CNA-Biological	Unknown	2.7	Entire length	2018	Yes
Indian Creek	WVOG-110	CNA-Biological	Unknown	19.7	Entire length	2023	Yes
Rockcastle Creek	WVOG-123	CNA-Biological	Unknown	4.0	Mouth to RM 4.0	2018	Yes
Little Pinnacle Creek	WVOG-124-P	CNA-Biological	Unknown	3.4	Entire length	2018	Yes
Sugar Run	WVOG-125	CNA-Biological	Unknown	2.1	Entire length	2018	Yes
Marsh Fork	WVOG-127-D	CNA-Biological	Unknown	3.5	Entire length	2018	Yes
Barkers Creek	WVOG-131	Fecal Coliform	Unknown	8.0	Entire length	2023	Yes
Mill Branch	WVOG-131-C	CNA-Biological	Unknown	2.6	Entire length	2018	Yes
Marsh Fork	WVOG-134-C	CNA-Biological	Unknown	3.9	Entire length	2018	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Big Branch	WVOG-136	CNA-Biological	Unknown	0.4	Mouth to RM 0.4	2018	Yes
Devils Fork	WVOG-137	Fecal Coliform	Unknown	4.9	Entire length	2023	Yes
Wiley Spring Branch	WVOG-137-C	CNA-Biological	Unknown	3.5	RM 0.7 to HW	2018	Yes
Winding Gulf	WVOG-138	Fecal Coliform	Unknown	15.5	Entire length	2023	Yes
Mullens Branch	WVOG-138-E	CNA-Biological	Unknown	1.4	Entire length	2018	Yes
Tommy Creek	WVOG-139-A	CNA-Biological	Unknown	6.2	Mouth to RM 6.2	2018	Yes
CLEAR FORK SUBWATERSHED							
Chestnut Flats Branch	WVOGC-16-B-1	CNA-Biological	Unknown	1.0	Entire length	2018	Yes
Cabin Branch	WVOGC-16-C	CNA-Biological	Unknown	2.0	Entire length	2018	Yes
Tom Bailey Branch	WVOGC-16-J-1	CNA-Biological	Unknown	2.0	Entire length	2018	Yes
White Oak Branch	WVOGC-16-N	CNA-Biological	Unknown	1.9	Entire length	2018	Yes
Franks Fork	WVOGC-16-U	CNA-Biological	Unknown	1.8	Entire length	2018	Yes

UPPER OHIO SOUTH WATERSHED - HUC# 05030106 *16 streams 112 miles*

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Ohio River (Upper South)	WVO-us	Dioxin	Unknown	42.4	MP 113.8 to MP 71.4 (Entire length)	2015	Yes
		Bacteria	Unknown	39.4	MP 113.8 to MP 89.2; 86.2-71.4	2012	Yes
		Iron	Unknown	42.4	MP 113.8 to MP 71.4 (Entire length)	2018	Yes
Fish Creek	WVO-77	CNA-Biological	Unknown	9.9	RM 16.7 to HW	2023	No
Conner Run	WVO-77-A	CNA-Biological	Unknown	0.4	Mouth to RM 0.4	2018	Yes
		Selenium AQ, HH	Unknown	0.4	Mouth to RM 0.4	2023	Yes
Bark Camp Run	WVO-77-H-0.8	CNA-Biological	Unknown	1.6	Entire length	2018	Yes
West Virginia Fork/Fish Creek	WVO-77-O	CNA-Biological	Unknown	22.0	Entire length	2023	Yes
Church Fork	WVO-77-O-11	CNA-Biological	Unknown	3.6	Entire length	2023	Yes
Boggs Run	WVO-86	CNA-Biological	Mining	4.2	Entire length	2013	Yes
Browns Run	WVO-86-A	CNA-Biological	Mining	1.7	Entire length	2013	Yes
UNT/Boggs Run RM 2.69	WVO-86-C	CNA-Biological	Mining	1.4	Entire length	2013	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/Wheeling Creek RM 25.77	WVO-88-M.3	CNA-Biological	Unknown	1.5	Entire length	2013	Yes
Graeb Hollow	WVO-89-A	CNA-Biological	Mining	1.3	Entire length	2013	Yes
Short Creek	WVO-90	CNA-Biological	Mining	10.3	Entire length	2013	Yes
Girty Run	WVO-90-A	CNA-Biological	Mining	2.0	Entire length	2013	Yes
North Fork/Short Creek	WVO-90-D	CNA-Biological	Mining	4.4	Entire length	2013	Yes
Huff Run	WVO-90-D-1	CNA-Biological	Mining	2.0	Entire length	2013	Yes
UNT/Ohio River MP 79.4	WVO-91	CNA-Biological	Mining	1.0	Entire length	2013	Yes

WEST FORK WATERSHED - HUC# 05020002

30 streams 181 miles

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
West Fork River	WVMW	CNA-Biological	Unknown	74.4	Mouth to RM 74.4 (Stonewall Jackson Dam)	2018	Yes
		Fecal Coliform	Unknown	74.4	Mouth to RM 74.4 (Stonewall Jackson Dam)	2018	Yes
		PCBs	Unknown	74.4	Mouth to RM 74.4 (Stonewall Jackson Dam)	2018	Yes
Bingamon Creek	WVMW-7	CNA-Biological	Unknown	14.6	Entire length	2018	Yes
Long Run	WVMW-7-B	CNA-Biological	Unknown	2.0	Entire length	2018	Yes
Cunningham Run	WVMW-7-D	CNA-Biological	Unknown	2.4	Entire length	2018	Yes
Glade Fork	WVMW-7-F	CNA-Biological	Unknown	5.0	Entire length	2018	Yes
Coal Lick Run	WVMW-7-F-1	CNA-Biological	Unknown	2.2	Entire length	2018	Yes
Browns Run	WVMW-10	CNA-Biological	Unknown	1.0	Entire length	2018	Yes
UNT/Shinns Run RM 4.15	WVMW-11-E	Aluminum (d)	Unknown	1.0	Entire length	2023	No
		CNA-Biological	Unknown	1.0	Entire length	2023	No
		Iron	Unknown	1.0	Entire length	2023	No
		pH	Unknown	1.0	Entire length	2023	No
Robinson Run	WVMW-12	CNA-Biological	Unknown	5.4	Entire length	2018	Yes
Big Elk Creek	WVMW-13-B-6	CNA-Biological	Unknown	3.0	Entire length	2018	Yes
Middle Run/Little Tenmile Creek	WVMW-13-B-7	CNA-Biological	Unknown	3.8	Entire length	2018	Yes

2010 Section 303(d) List

WEST VIRGINIA

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Mudlick Run	WVMW-13-B-9	CNA-Biological	Unknown	2.4	Entire length	2018	Yes
Salem Fork	WVMW-13-I	CNA-Biological	Unknown	9.2	Entire length	2018	Yes
Cherrycamp Run	WVMW-13-I-2	CNA-Biological	Unknown	3.2	Entire length	2018	Yes
Patterson Fork	WVMW-13-I-3	CNA-Biological	Unknown	2.4	Entire length	2018	Yes
UNT/Patterson Fork RM 0.59	WVMW-13-I-3-B	CNA-Biological	Unknown	1.8	Entire length	2023	Yes
Davisson Run	WVMW-15-D	CNA-Biological	Unknown	3.0	Entire length	2018	Yes
Ann Run	WVMW-15-E	CNA-Biological	Unknown	3.6	Entire length	2018	Yes
Johnson Fork	WVMW-20-C	CNA-Biological	Unknown	1.5	Entire length	2018	Yes
Turkey Run	WVMW-21-E	CNA-Biological	Unknown	1.7	Entire length	2018	Yes
Rooting Creek	WVMW-21-M-1	CNA-Biological	Unknown	8.4	Entire length	2023	Yes
Bonds Run	WVMW-26-A	CNA-Biological	Unknown	1.4	Entire length	2018	Yes
Duck Creek	WVMW-28	CNA-Biological	Unknown	4.0	Entire length	2023	Yes
Isaacs Creek	WVMW-29	CNA-Biological	Unknown	6.2	Entire length	2018	Yes
Sycamore Lick	WVMW-35	CNA-Biological	Unknown	1.8	Entire length	2023	Yes
UNT/West Fork River RM 65.49	WVMW-36.4	CNA-Biological	Unknown	1.5	Entire length	2023	Yes
Right Fork/Stonecoal Creek	WVMW-38-G	CNA-Biological	Unknown	1.2	Mouth to RM 1.2 (below impoundment)	2018	Yes
Pringle Fork	WVMW-38-G-3	CNA-Biological	Unknown	1.3	Mouth to RM 1.3	2018	Yes
Polk Creek	WVMW-39	CNA-Biological	Unknown	8.5	Entire length	2023	No
		Fecal Coliform	Unknown	8.5	Entire length	2023	No
Hughes Fork	WVMW-46-G	CNA-Biological	Unknown	2.6	Entire length	2018	Yes

Supplemental Table A - Previously Listed Waters - No TMDL Developed

Supplemental Table A - Previously Listed Waters - No TMDL Developed - 2010

Stream Name	Stream Code	Criteria	Reason for Delisting
HYDROLOGIC GROUP A			
CHEAT WATERSHED - HUC# 05020004			
Cheat Lake	WVMC-(L1)	Mercury	Data used for (previous) listing has been deemed inappropriate
Big Sandy Creek	WVMC-12	Aluminum (trout)	Stream is no longer considered trout and data does not support listing
Crab Orchard Run	WVMC-17-0.7A	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
Church Creek	WVMC-23-A	Manganese	Data used for (previous) listing has been deemed inappropriate
UNT/Church Creek RM 1.26	WVMC-23-A-1	Manganese	Data used for (previous) listing has been deemed inappropriate
UNT/UNT RM 0.12/Church Creek	WVMC-23-A-1-A	Manganese	Data used for (previous) listing has been deemed inappropriate
Dry Fork/Black Fork/Cheat River	WVMC-60Dry	Mercury	Data used for (previous) listing has been deemed inappropriate
Shavers Fork	WVMCS	Mercury	Data used for (previous) listing has been deemed inappropriate
UPPER KANAWHA WATERSHED - HUC# 05050006			
Kanawha River (Upper)	WVK-up	Mercury	
SOUTH BRANCH POTOMAC WATERSHED - HUC# 02070001			
South Branch Potomac River	WVPSB	Aluminum (d) (trout)	Listed in error
South Fork/South Branch Potomac River	WVPSB-21	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
		Mercury	Data used for (previous) listing has been deemed inappropriate
SHENANDOAH (JEFFERSON) WATERSHED - HUC# 02070007			
Flowing Springs Run	WVS-1	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
Evitts Run	WVS-4	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
Bullskin Run	WVS-6	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
Hog Run	WVS-8	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable

Supplemental Table A - Previously Listed Waters - No TMDL Developed - 2010

Stream Name	Stream Code	Criteria	Reason for Delisting
HYDROLOGIC GROUP B			
ELK WATERSHED - HUC# 05050007			
Sutton Lake	WVKE-(L1)	Mercury	Data used for (previous) listing has been deemed inappropriate
Joes Hollow	WVKE-14-K	CNA-Biological	New biological data does not support listing
Buffalo Creek	WVKE-50	Fecal Coliform	New water quality data does not support listing
Lilly Fork	WVKE-50-B	CNA-Biological	New biological data does not support listing
Bear Run	WVKE-84.5	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
LOWER KANAWHA WATERSHED - HUC# 05050008			
Kanawha River (Lower)	WVK-lo	Mercury	Data used for (previous) listing has been deemed inappropriate
Spring Branch	WVKP-9-A	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
UNT/Dog Fork RM 1.88	WVKP-17-F-3	CNA-Biological	New biological data does not support listing
Ward Hollow	WVK-39-A	CNA-Biological	Biological data used for (previous) listing has been deemed non-comparable
NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002			
Patterson Creek	WVPNB-4	CNA-Biological	New biological data does not support listing
TYGART VALLEY WATERSHED - HUC# 05020001			
Tygart Lake	WVMT-(L1)	Mercury	Data used for (previous) listing has been deemed inappropriate

Supplemental Table A - Previously Listed Waters - No TMDL Developed - 2010

Stream Name	Stream Code	Criteria	Reason for Delisting
HYDROLOGIC GROUP C			
GAULEY WATERSHED - HUC# 05050005			
Summersville Lake	WVKG-(L1)	Mercury	Data used for (previous) listing has been deemed inappropriate
		PCBs	New Fish Tissue data does not support listing
LOWER GUYANDOTTE WATERSHED - HUC# 05070102			
Pats Branch	WVOG-0.5	Fluoride	Remove from Category 4b due to removal of Drinking Water (A) and Agriculture and Wildlife (D1) uses
MIDDLE OHIO NORTH WATERSHED - HUC# 05030201			
French Creek	WVO-57	CNA-Biological	New biological data does not support listing
Elk Fork	WVOMI-23-B	CNA-Biological	New biological data does not support listing
Big Run	WVOMI-29-A	CNA-Biological	New biological data does not support listing
Big Isaac Creek	WVOMI-46-R	CNA-Biological	New biological data does not support listing
MIDDLE OHIO SOUTH WATERSHED - HUC# 05030202			
Trace Fork	WVO-21-C	CNA-Biological	New biological data does not support listing
Biglick Run	WVO-36-I-4	CNA-Biological	New biological data does not support listing
UNT/Jesse Run RM 0.44	WVO-43-D-2-0.5A	CNA-Biological	New biological data does not support listing
POTOMAC DIRECT DRAINS WATERSHED - HUC# 02070004			
Opequon Creek	WVP-4	Aluminum (d) (trout)	Listed in error

Supplemental Table A - Previously Listed Waters - No TMDL Developed - 2010

Stream Name	Stream Code	Criteria	Reason for Delisting
HYDROLOGIC GROUP D			
GREENBRIER WATERSHED - HUC# 05050003			
Greenbrier River	WVKNG	Mercury	Data used for (previous) listing has been deemed inappropriate
LITTLE KANAWHA WATERSHED - HUC# 05030203			
Little Kanawha River	WVLK	Mercury	Data used for (previous) listing has been deemed inappropriate
		PCBs	New Fish Tissue data does not support listing
Burnsville Lake	WVLK-(L1)	Mercury	Data used for (previous) listing has been deemed inappropriate
Hughes River	WVLKH	Mercury	Data used for (previous) listing has been deemed inappropriate
MONONGAHELA WATERSHED - HUC# 05020003			
Monongahela River	WVM	PCBs	New Fish Tissue data does not support listing
Booths Creek	WVM-10	Aluminum (trout)	Stream is no longer considered trout and data does not support listing
		Iron (trout) AQ	Stream is no longer considered trout and data does not support listing
Indian Creek	WVM-17	Iron	New water quality criteria does not support listing
HYDROLOGIC GROUP E			
WEST FORK WATERSHED - HUC# 05020002			
West Fork River	WVMW	Zinc (d)	New water quality criteria does not support listing
Stonewall Jackson Lake	WVMW-(L1)	Mercury	Data used for (previous) listing has been deemed inappropriate

Supplemental Table B - Previously Listed Waters - TMDL Developed

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

HYDROLOGIC GROUP A

CHEAT WATERSHED - HUC# 05020004

Stream Name	Stream Code	Criteria	TMDL Date
Cheat River	WVMC	Iron	2001
		pH	2001
		Zinc	2001
UNT/Cheat River RM 4.07	WVMC-0.5	Iron	2001
		pH	2001
UNT/Cheat River RM 7.70	WVMC-2.3	Iron	2001
		pH	2001
UNT/Cheat River RM 8.39	WVMC-2.4	Iron	2001
		pH	2001
Crammeys Run	WVMC-3	Iron	2001
Bull Run	WVMC-11	Iron	2001
		pH	2001
UNT/Bull Run RM 1.64	WVMC-11-0.1A	pH	2001
Middle Run	WVMC-11-A	Iron	2001
		pH	2001
Mountain Run	WVMC-11-B	Iron	2001
		pH	2001
Lick Run	WVMC-11-B-1	Iron	2001
		pH	2001
UNT/Bull Run RM 3.73	WVMC-11-C	Iron	2001
		pH	2001
Right Fork Bull Run	WVMC-11-E	Iron	2001
		pH	2001
Big Sandy Creek	WVMC-12	Iron (trout)	2001
		pH	2001

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Big Sandy Creek RM 2.91	WVMC-12-0.2A	Iron	2001
		pH	2001
Sovern Run	WVMC-12-0.5A	Iron	2001
		pH	2001
Little Sandy Creek	WVMC-12-B	Iron (trout)	2001
		pH	2001
Webster Run	WVMC-12-B-0.5	Iron	2001
		pH	2001
Beaver Creek	WVMC-12-B-1	Iron	2001
		pH	2001
Glade Run	WVMC-12-B-1-A	Iron	2001
		pH	2001
UNT/Beaver Creek RM 1.68	WVMC-12-B-1-C	Iron	2001
		pH	2001
Hog Run	WVMC-12-B-3	Iron	2001
		pH	2001
Cherry Run	WVMC-12-B-5	Iron (trout)	2001
		pH	2001
Hazel Run	WVMC-12-C	Iron	2001
		pH	2001
Conner Run	WVMC-13.5	Iron	2001
		pH	2001
Greens Run	WVMC-16	Iron	2001
		pH	2001
South Fork/Greens Run	WVMC-16-A	Iron	2001
UNT/South Fork RM 0.63/Greens Run	WVMC-16-A-1	Iron	2001
		pH	2001

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Muddy Creek	WVMC-17	Iron	2001
		Iron (trout)	2001
		pH	2001
Martin Creek	WVMC-17-A	Iron	2001
		pH	2001
Fickey Run	WVMC-17-A-0.5	Iron	2001
		pH	2001
Glade Run	WVMC-17-A-1	Iron	2001
		pH	2001
UNT/Glade Run RM 1.06	WVMC-17-A-1-A	Iron	2001
		pH	2001
UNT/Glade Run RM 1.36	WVMC-17-A-1-B	Iron	2001
		pH	2001
Roaring Creek	WVMC-18	Iron	2001
		Iron (trout)	2001
		pH	2001
Morgan Run	WVMC-23	Iron	2001
		Manganese	2001
		pH	2001
UNT/Morgan Run RM 1.03	WVMC-23-0.2A	Manganese	2001
		pH	2001
Church Creek	WVMC-23-A	Iron	2001
		Manganese	2001
		pH	2001
UNT/Church Creek RM 1.26	WVMC-23-A-1	Iron	2001
		Manganese	2001
		pH	2001

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Heather Run	WVMC-24	Iron	2001
		Manganese	2001
		pH	2001
UNT/Heather Run RM 1.47	WVMC-24-A	Iron	2001
		Manganese	2001
		pH	2001
Lick Run	WVMC-25	Iron	2001
		Manganese	2001
		pH	2001
Joes Run	WVMC-26	Iron	2001
		Manganese	2001
Pringle Run	WVMC-27	Iron	2001
		Manganese	2001
		pH	2001
UNT/Pringle Run RM 1.75	WVMC-27-A	Iron	2001
		Manganese	2001
		pH	2001
UNT/Pringle Run RM 3.60	WVMC-27-E	Iron	2001
		pH	2001
Blackwater River	WVMC-60-D	Iron (trout)	2001
		Oxygen, Dissolved	1998
Tub Run	WVMC-60-D-2	Iron	2001
		pH	2001
Finley Run	WVMC-60-D-2.7	Iron	2001
		pH	2001
North Fork/Blackwater River	WVMC-60-D-3	Iron	2001
		pH	2001
Long Run	WVMC-60-D-3-A	Iron	2001
		pH	2001

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Middle Run	WVMC-60-D-3-B	Iron	2001
		pH	2001
Snyder Run	WVMC-60-D-3-C	Iron	2001
		pH	2001
Beaver Creek	WVMC-60-D-5	Iron	2001
		pH	2001
Hawkins Run	WVMC-60-D-5-C	Iron	2001
		pH	2001

SHENANDOAH (JEFFERSON) WATERSHED - HUC# 02070007

Stream Name	Stream Code	Criteria	TMDL Date
Shenandoah River	WVS	PCBs	2001

SOUTH BRANCH POTOMAC WATERSHED - HUC# 02070001

Stream Name	Stream Code	Criteria	TMDL Date
South Branch Potomac River	WVPSB	Fecal Coliform	1998
Anderson Run	WVPSB-18	Fecal Coliform	1998
Mill Creek	WVPSB-25	Fecal Coliform	1998
Lunice Creek	WVPSB-26	Fecal Coliform	1998

UPPER KANAWHA WATERSHED - HUC# 05050006

Stream Name	Stream Code	Criteria	TMDL Date
Campbells Creek	WVK-49	CNA-Biological	2005
		Fecal Coliform	2005
Dry Branch	WVK-49-A	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
Spring Fork	WVK-49-B	Aluminum (d)	2005
		Fecal Coliform	2005
UNT/Left Fork RM 0.12/Spring Fork	WVK-49-B-2-A	Iron	2005

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Coal Fork	WVK-49-D	Fecal Coliform	2005
Pointlick Fork	WVK-49-F	Fecal Coliform	2005
Wash Branch	WVK-49-F.5	Fecal Coliform	2005
Cline Branch	WVK-49-G	Fecal Coliform	2005
Big Bottom Hollow	WVK-49-H	CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
UNT/Campbells Creek RM 7.5 (Sprucepine Ho	WVK-49-J	Fecal Coliform	2005
Lens Creek	WVK-53	CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
Left Fork/Lens Creek	WVK-53-A	Fecal Coliform	2005
		Iron	2005
UNT/Left Fork RM 1.83/Lens Creek	WVK-53-A-0.4	Aluminum (d)	2005
		Iron	2005
		pH	2005
Ring Hollow	WVK-53-B	Fecal Coliform	2005
Fourmile Fork	WVK-53-C	CNA-Biological	2005
		Fecal Coliform	2005
Witcher Creek	WVK-57	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
		pH	2005
Dry Branch	WVK-57-A	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
Left Fork/Witcher Creek	WVK-57-C	Fecal Coliform	2005

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Counterfeit Branch	WVK-57-D	Iron	2005
UMT/Witcher Creek RM 5.18	WVK-57-D.5	Aluminum (d)	2005
		pH	2005
Fields Creek	WVK-58	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
Scott Branch	WVK-58-B	Fecal Coliform	2005
Wolfpen Hollow	WVK-58-B.1	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
		pH	2005
Coopers Hollow	WVK-58-B.3	Fecal Coliform	2005
Mill Branch	WVK-58-B.8	Aluminum (d)	2005
New West Hollow	WVK-58-B.8-1	Aluminum (d)	2005
		Iron	2005
South Hollow	WVK-58-C	CNA-Biological	2005
Carroll Branch	WVK-59	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
		pH	2005
Slaughter Creek	WVK-60	Aluminum (d)	2005
Little Creek	WVK-60-A	Aluminum (d)	2005
		CNA-Biological	2005
		pH	2005
UNT/Little Creek RM 0.39	WVK-60-A-1	Aluminum (d)	2005
		pH	2005
Bradley Fork	WVK-60-B	Aluminum (d)	2005
		pH	2005

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Slaughter Creek RM 3.14	WVK-60-B.1	Aluminum (d)	2005
		pH	2005
Cabin Creek	WVK-61	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
		pH	2005
Dry Branch	WVK-61-B	Fecal Coliform	2005
		Iron	2005
UNT/Dry Branch RM 0.74	WVK-61-B-1	Aluminum (d)	2005
		CNA-Biological	2005
		pH	2005
Paint Branch	WVK-61-E	Iron	2005
Longbottom Creek	WVK-61-F	Fecal Coliform	2005
Left Fork/Longbottom Creek	WVK-61-F-1	CNA-Biological	2005
Greens Branch	WVK-61-G	Fecal Coliform	2005
		pH	2005
Coal Fork	WVK-61-H	Aluminum (d)	2005
Laurel Fork/Coal Fork	WVK-61-H-1	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
		CNA-Biological	2005
UNT/Coal Fork RM 4.63	WVK-61-H-3	Aluminum (d)	2005
		Iron	2005
Bear Hollow	WVK-61-I	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		pH	2005

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Bear Hollow RM 0.28	WVK-61-I-1	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		pH	2005
Cane Fork	WVK-61-J	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
		pH	2005
Toms Fork	WVK-61-K	Aluminum (d)	2005
Tenmile Fork	WVK-61-L	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
UNT/Tenmile Fork RM 1.22	WVK-61-L-0.5	Aluminum (d)	2005
UNT/Tenmile Fork RM 4.17	WVK-61-L-5	Iron	2005
Fifteenmile Fork	WVK-61-O	Aluminum (d)	2005
		Iron	2005
		pH	2005
Abbott Creek	WVK-61-O-1	Aluminum (d)	2005
		Iron	2005
		pH	2005
Hicks Hollow	WVK-61.5	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
		pH	2005
Watson Branch	WVK-62	Aluminum (d)	2005
		pH	2005

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Mile Branch	WVK-63	Aluminum (d)	2005
		CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
Paint Creek	WVK-65	pH	2001
Jones Branch	WVK-65-C	Iron	2001
Tenmile Fork	WVK-65-M	Iron	2001
		pH	2001
Long Branch	WVK-65-M-1	Iron	2001
		pH	2001
Hickory Camp Branch	WVK-65-P	CNA-Biological	2001
		Iron	2001
		pH	2001
Cedar Creek	WVK-65-Q	pH	2001
UNT/Paint Creek RM 16.71	WVK-65-Q.3	Iron	2001
		pH	2001
UMT/Paint Creek RM 17.10	WVK-65-Q.5	Iron	2001
		pH	2001
Fifteenmile Creek	WVK-65-R	Iron	2001
Spring Branch	WVK-65-S	pH	2001
Skitter Creek	WVK-65-T	Iron	2001
Lykins Creek	WVK-65-W	Iron	2001
		pH	2001
Long Branch	WVK-65-Y-2	Iron	2001
Packs Branch	WVK-65-DD	Iron	2001
Big Fork	WVK-65-DD-2	Iron	2001

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Morris Creek	WVK-70	CNA-Biological	2005
		Iron	2005
		Manganese	2005
		pH	2005
Schuyler Fork	WVK-70-A	Aluminum (d)	2005
		pH	2005
Staten Run	WVK-71	CNA-Biological	2005
		Iron	2005
Smithers Creek	WVK-72	Aluminum (d)	2005
Blake Branch	WVK-72-A	Aluminum (d)	2005
		Fecal Coliform	2005
Fishhook Fork	WVK-72-A-1	Aluminum (d)	2005
		Manganese	2005
Bullpush Fork	WVK-72-B	Aluminum (d)	2005
Burnett Hollow	WVK-72-B-2	Aluminum (d)	2005
Armstrong Creek	WVK-73	Aluminum (trout)	2005
		CNA-Biological	2005
		pH	2005
Tucker Hollow	WVK-73-A	Aluminum (d)	2005
		pH	2005
Jenkins Fork	WVK-73-D	Aluminum (d)	2005
		CNA-Biological	2005
		pH	2005
Craig Hollow	WVK-73-D-1	Aluminum (d)	2005
		pH	2005
Powellton Fork	WVK-73-E	Aluminum (d)	2005
		Iron	2005
Laurel Branch/Powellton Fork	WVK-73-E-1	Iron	2005
Woodrum Branch	WVK-73-E-2	Iron	2005

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Right Fork/Armstrong Creek	WVK-73-F	Aluminum (d)	2005
		pH	2005
Boomer Branch	WVK-74	Aluminum (d)	2005
		CNA-Biological	2005
Jarrett Branch	WVK-75	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
		pH	2005
UNT/Jarrett Branch RM 1.21	WVK-75-A	Aluminum (d)	2005
		pH	2005
Loop Creek	WVK-76	Fecal Coliform	2005
Mulberry Fork	WVK-76-C	Fecal Coliform	2005
Beards Fork	WVK-76-D	Aluminum (d)	2005
Ingram Branch	WVK-76-K	Aluminum (d)	2005
		CNA-Biological	2005
		pH	2005
UPPER OHIO NORTH WATERSHED - HUC# 05030101			
Ohio River (Upper North)	WVO-un	PCBs	2002
Cross Creek	WVO-95	CNA-Biological	2005
		Fecal Coliform	2005
UNT/Cross Creek RM 1.81	WVO-95-0.5A	Fecal Coliform	2005
Bosley Run	WVO-95-A	CNA-Biological	2005
		Fecal Coliform	2005
North Potrock Run	WVO-95-C	Fecal Coliform	2005
Potrock Run	WVO-95-D	CNA-Biological	2005
		Fecal Coliform	2005
Alleghany Steel Run	WVO-95.5	CNA-Biological	2005
		Fecal Coliform	2005

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
UMT/Alleghany Steel Run RM 1.09	WVO-95.5-A	CNA-Biological	2005
		Fecal Coliform	2005
Harmon Creek	WVO-97	CNA-Biological	2005
		Fecal Coliform	2005
UNT/Harmon Creek RM 2.95	WVO-97-0.7A	Fecal Coliform	2005
UNT/Harmon Creek RM 3.32	WVO-97-0.9A	Fecal Coliform	2005
Sappingtons Run	WVO-97-A	CNA-Biological	2005
		Fecal Coliform	2005
Alexanders Run	WVO-97-B	CNA-Biological	2005
		Fecal Coliform	2005
		Iron	2005
Mechling Run	WVO-97-C	Fecal Coliform	2005
Brown Hollow	WVO-97-D	CNA-Biological	2005
		Fecal Coliform	2005
Kings Creek	WVO-98	Fecal Coliform	2005
Turkeyfoot Run	WVO-98-0.5A	Fecal Coliform	2005
Rush Run	WVO-98-0.7A	CNA-Biological	2005
		Fecal Coliform	2005
North Fork/Kings Creek	WVO-98-A	Fecal Coliform	2005
Marrow Run	WVO-98-A.5	CNA-Biological	2005
		Fecal Coliform	2005
UNT/Kings Creek RM 6.95	WVO-98-C	Fecal Coliform	2005
Deep Gut Run	WVO-101	Aluminum (d)	2005
		CNA-Biological	2005
		Iron	2005
		pH	2005
Tomlinson Run Lake	WVO-102-(L1)	Sedimentation/Siltation	1998

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
South Fork/Tomlinson Run	WVO-102-B	CNA-Biological	2005
		Fecal Coliform	2005
North Fork/Tomlinson Run	WVO-102-C	CNA-Biological	2005
		Fecal Coliform	2005
Mercer Run	WVO-102-C-1	CNA-Biological	2005
		Fecal Coliform	2005
UNT/North Fork RM 4.48/Tomlinson Run	WVO-102-C-6	Fecal Coliform	2005

YOUGHIOGHENY WATERSHED - HUC# 05020006

Stream Name	Stream Code	Criteria	TMDL Date
Buffalo Run	WVMY-0.2	Fecal Coliform	2009
		pH	2009
Snowy Creek	WVMY-2	CNA-Biological	2009
		Fecal Coliform	2009
		Iron (trout) AQ, HH	2009
Laurel Run	WVMY-2-0.2A	Iron	2009
		Aluminum (dis)	2009
		pH	2009
Little Laurel Run	WVMY-2-0.2A-1	pH	2009
North Branch/Snowy Creek	WVMY-2-A	Fecal Coliform	2009
		Iron (trout) AQ	2009
Wardwell Run	WVMY-2-A-1	CNA-Biological	2009
		Fecal Coliform	2009
South Branch/Snowy Creek	WVMY-2-B	Fecal Coliform	2009
Rhine Creek	WVMY-4	Fecal Coliform	2009
Maple Run	WVMY-5	CNA-Biological	2009
		Fecal Coliform	2009
UNT/Maple Run RM 5.22	WVMY-5-E	Fecal Coliform	2009

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP B			
COAL WATERSHED - HUC# 05050009			
Big Coal River or Coal River	WVKC	Fecal Coliform	2006
Browns Creek	WVKC-2	CNA-Biological	2006
		Fecal Coliform	2006
Smith Creek	WVKC-4	CNA-Biological	2006
		Fecal Coliform	2006
Martin Creek	WVKC-4-A	Fecal Coliform	2006
Little Smith Creek	WVKC-4-C	CNA-Biological	2006
		Fecal Coliform	2006
Falls Creek	WVKC-5	Fecal Coliform	2006
Fuquay Creek	WVKC-8	Fecal Coliform	2006
Crooked Creek	WVKC-9	CNA-Biological	2006
		Fecal Coliform	2006
Alum Creek	WVKC-9.5	Fecal Coliform	2006
UNT/Alum Creek RM 1.53	WVKC-9.5-A	Fecal Coliform	2006
Little Alum Creek	WVKC-9.5-B	Fecal Coliform	2006
Little Coal River	WVKC-10	Fecal Coliform	2006
Cobb Creek	WVKC-10-E	Fecal Coliform	2006
Dicks Creek	WVKC-10-F	Iron	2006
Little Hewitt Creek	WVKC-10-H	Iron	2006
		pH	2006
Big Horse Creek	WVKC-10-I	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Laurel Fork	WVKC-10-I-2	Fecal Coliform	2006
		Iron	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Peters Cave Fork	WVKC-10-I-3	Fecal Coliform	2006
		Iron	2006
Dodson Fork	WVKC-10-I-6	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Rich Hollow	WVKC-10-I-8	Iron	2006
Little Horse Creek	WVKC-10-J	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
UMT/Little Horse Creek RM 2.31	WVKC-10-J-8	Fecal Coliform	2006
Camp Creek	WVKC-10-L	Fecal Coliform	2006
Rock Creek	WVKC-10-N	CNA-Biological	2006
		Fecal Coliform	2006
Hubbard Fork	WVKC-10-N-2	CNA-Biological	2006
		Fecal Coliform	2006
Right Fork/Rock Creek	WVKC-10-N-3	CNA-Biological	2006
		Fecal Coliform	2006
Left Fork/Rock Creek	WVKC-10-N-4	CNA-Biological	2006
		Fecal Coliform	2006
Lick Creek	WVKC-10-O	CNA-Biological	2006
		Fecal Coliform	2006
Turtle Creek	WVKC-10-P	CNA-Biological	2006
		Fecal Coliform	2006
Spruce Fork	WVKC-10-T	Fecal Coliform	2006
		Iron	2006
Sparrow Creek	WVKC-10-T-1	Fecal Coliform	2006
Laurel Branch	WVKC-10-T-2	Fecal Coliform	2006
Low Gap Creek	WVKC-10-T-3	Fecal Coliform	2006

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Hunters Branch	WVKC-10-T-5	Aluminum (d)	2006
		Iron	2006
		pH	2006
Sixmile Creek	WVKC-10-T-7	Fecal Coliform	2006
Bias Branch	WVKC-10-T-8	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Hewett Creek	WVKC-10-T-9	Fecal Coliform	2006
		Iron	2006
Meadow Fork	WVKC-10-T-9-A	Fecal Coliform	2006
Missouri Fork	WVKC-10-T-9-B	CNA-Biological	2006
		Fecal Coliform	2006
Isom Branch	WVKC-10-T-9-B.5	Fecal Coliform	2006
Craddock Fork	WVKC-10-T-9-C	Fecal Coliform	2006
		Iron	2006
Sycamore Branch	WVKC-10-T-9-C-2	Fecal Coliform	2006
Baldwin Fork	WVKC-10-T-9-D	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Stollings Branch	WVKC-10-T-10	Fecal Coliform	2006
Spruce Laurel Fork	WVKC-10-T-11	CNA-Biological	2006
		Iron	2006
Sycamore Fork	WVKC-10-T-11-F	Iron	2006
Dennison Fork	WVKC-10-T-11-K	Iron	2006
Rockhouse Creek	WVKC-10-T-13	Fecal Coliform	2006
		Iron	2006
Beech Creek	WVKC-10-T-15	Iron	2006
		Selenium	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Left Fork/Beech Creek	WVKC-10-T-15-A	Iron	2006
		Selenium	2006
Seng Camp Creek	WVKC-10-T-16	Iron	2006
Trace Branch	WVKC-10-T-19	Iron	2006
		Selenium	2006
White Oak Branch	WVKC-10-T-22	Iron	2006
Brushy Fork	WVKC-10-T-24	Iron	2006
Laurel Fork	WVKC-10-T-25	Iron	2006
Pond Fork	WVKC-10-U	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Robinson Creek	WVKC-10-U-3	Iron	2006
Jacks Branch	WVKC-10-U-4	Iron	2006
Bull Creek	WVKC-10-U-5	Iron	2006
West Fork/Pond Fork	WVKC-10-U-7	CNA-Biological	2006
		Iron	2006
Whites Branch	WVKC-10-U-7-B	Fecal Coliform	2006
		Iron	2006
James Creek	WVKC-10-U-7-I	Iron	2006
		Selenium	2006
Casey Creek	WVKC-10-U-8	CNA-Biological	2006
		Iron	2006
		Selenium	2006
Beaver Pond Branch	WVKC-10-U-9	Iron	2006
		Selenium	2006
Lacey Branch	WVKC-10-U-21	Iron	2006
Brier Creek	WVKC-13	Fecal Coliform	2006
Fork Creek	WVKC-14	Iron	2006
Bull Creek	WVKC-16	Iron	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Lick Creek	WVKC-19	CNA-Biological	2006
		Fecal Coliform	2006
Brush Creek	WVKC-21	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Honeycamp Fork	WVKC-21-A	Iron	2006
Ridgeview Hollow	WVKC-21-C	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Drawdy Creek	WVKC-24	Fecal Coliform	2006
		Iron	2006
Short Creek	WVKC-26	Fecal Coliform	2006
Toneys Branch	WVKC-27	Fecal Coliform	2006
		Iron	2006
Joes Creek	WVKC-29	Fecal Coliform	2006
		Iron	2006
Left Fork/Joes Creek	WVKC-29-A	Fecal Coliform	2006
Laurel Creek	WVKC-31	Fecal Coliform	2006
		Iron	2006
Sandlick Creek	WVKC-31-A	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Hopkins Fork	WVKC-31-B	Fecal Coliform	2006
		Iron (trout) AQ	2006
Big Jarrells Creek	WVKC-31-B-2	Fecal Coliform	2006
		Iron	2006
Logan Fork	WVKC-31-B-3	Iron	2006

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Cold Fork	WVKC-31-C	Aluminum (d)	2006
		Iron	2006
		pH	2006
Little Laurel Creek	WVKC-31-G	Iron	2006
Mudlick Fork	WVKC-31-H	Iron	2006
Horse Branch	WVKC-32	Aluminum (d)	2006
		Iron	2006
		pH	2006
Haggle Branch	WVKC-33	Aluminum (d)	2006
		Iron	2006
		pH	2006
Jakes Branch	WVKC-34	Iron	2006
White Oak Creek	WVKC-35	Iron	2006
		Selenium	2006
Threemile Branch	WVKC-35-D	Aluminum (d)	2006
		Iron	2006
		pH	2006
Left Fork/White Oak Creek	WVKC-35-E	Iron	2006
		Selenium	2006
UNT/Big Coal River RM 33.84	WVKC-35.8	Aluminum (d)	2006
		Iron	2006
		pH	2006
Little Elk Creek	WVKC-39	Iron	2006
Seng Creek	WVKC-42	Fecal Coliform	2006
		Iron	2006
		Selenium	2006
Elk Run	WVKC-43	Iron	2006

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Marsh Fork	WVKC-46	Fecal Coliform	2006
		Iron	2006
		Iron (trout) AQ	2006
Little Marsh Fork	WVKC-46-A	Iron	2006
		Manganese	2006
Brushy Fork	WVKC-46-A-4	Iron	2006
		Manganese	2006
Ellis Creek	WVKC-46-B	Iron	2006
Hazy Creek	WVKC-46-C	Iron	2006
Stink Run	WVKC-46-E	Fecal Coliform	2006
		Iron	2006
Horse Creek	WVKC-46-F	Iron	2006
Peachtree Creek	WVKC-46-G	Iron	2006
Drews Creek	WVKC-46-G-1	Iron	2006
Martin Fork	WVKC-46-G-2	Aluminum (d)	2006
		Iron	2006
		pH	2006
Millers Fork	WVKC-46-G-3	Iron	2006
Dry Creek	WVKC-46-H	Fecal Coliform	2006
Rock Creek	WVKC-46-I	Fecal Coliform	2006
		Iron	2006
Righthand Fork	WVKC-46-I-1	Fecal Coliform	2006
Flat Branch	WVKC-46-I.7	Fecal Coliform	2006
Sandlick Creek	WVKC-46-J	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Bee Branch	WVKC-46-J-2	Aluminum (d)	2006
		pH	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Right Fork/Sandlick Creek	WVKC-46-J-3	CNA-Biological	2006
		Fecal Coliform	2006
Wingrove Branch	WVKC-46-J-4	Fecal Coliform	2006
		Iron	2006
Harper Branch	WVKC-46-J-7	Iron	2006
Cove Creek	WVKC-46-K	Fecal Coliform	2006
		Iron	2006
UNT/Cove Creek RM 1.22	WVKC-46-K-2	Fecal Coliform	2006
Breckenridge Creek	WVKC-46-L	Fecal Coliform	2006
UNT/Breckenridge Creek RM 3.04	WVKC-46-L-1	Fecal Coliform	2006
Spanker Branch	WVKC-46-M	Fecal Coliform	2006
Maple Meadow Creek	WVKC-46-N	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Rockhouse Fork	WVKC-46-N-1	Fecal Coliform	2006
		Iron	2006
Claypool Hollow	WVKC-46-N.9	Fecal Coliform	2006
Dingess Branch	WVKC-46-O	Fecal Coliform	2006
		Iron	2006
Surveyor Creek	WVKC-46-P	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Millers Camp Branch	WVKC-46-Q	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Clay Branch	WVKC-46-Q-0.1	Fecal Coliform	2006
Stephens Branch	WVKC-46-Q-1	Iron	2006
Shockley Branch	WVKC-46-Q-3	Iron	2006
Laurel Branch	WVKC-46-Q-4	Iron	2006

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Jehu Branch	WVKC-46-Q-5	Iron	2006
Clear Fork	WVKC-47	Aluminum (trout)	2006
		CNA-Biological	2006
		Fecal Coliform	2006
		Iron (trout)	2006
Sycamore Creek	WVKC-47-E	Fecal Coliform	2006
		Iron	2006
Stonecoal Branch	WVKC-47-F	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
		pH	2006
Long Branch	WVKC-47-G	Iron	2006
Dow Fork	WVKC-47-G-1	Aluminum (d)	2006
		Iron	2006
		pH	2006
Fulton Creek	WVKC-47-I	Iron	2006
White Oak Creek	WVKC-47-K	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Left Fork/White Oak Creek	WVKC-47-K-1	Iron	2006
Toney Fork	WVKC-47-L	Fecal Coliform	2006
		Iron	2006
Buffalo Fork	WVKC-47-L-1	Iron	2006
McDowell Branch	WVKC-47-N	Fecal Coliform	2006
		Iron	2006
Lick Run	WVKC-47-P.5	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
ELK WATERSHED - HUC# 05050007			
Elk River	WVKE	Iron	2001
		Lead	2001
Morris Creek	WVKE-26	Iron	2001
		Manganese	2001
		pH	2001
Left Fork/Morris Creek	WVKE-26-A	Iron	2001
		Manganese	2001
		pH	2001
Buffalo Creek	WVKE-50	Iron	2001
Pheasant Run	WVKE-50-T	Iron	2001
		pH	2001
LOWER KANAWHA WATERSHED - HUC# 05050008			
Kanawha River (Lower)	WVK-lo	Dioxin	2000
Hurricane Water Supply Reservoir	WVK-22-F-(L1)	Iron	1998
		Sedimentation/Siltation	1998
		Trophic State Index	1998
Armour Creek	WVK-30	Dioxin	2000
Ridenour Lake	WVK-30-A-(L1)	Iron	1999
		Sedimentation/Siltation	1999
		Trophic State Index	1999
Twomile Creek	WVK-41	CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
Woodward Branch	WVK-41-A	Fecal Coliform	2006
Pfieffer Branch	WVK-41-A-1	Fecal Coliform	2006
UNT/Woodward Branch RM 0.86	WVK-41-A-2	Fecal Coliform	2006

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Chandler Branch	WVK-41-B	Fecal Coliform	2006
Sugar Creek	WVK-41-C	Fecal Coliform	2006
Left Fork/Twomile Creek	WVK-41-D	Fecal Coliform	2006
UNT/Left Fork RM 0.53/Twomile Creek	WVK-41-D-1	CNA-Biological	2006
		Fecal Coliform	2006
Rich Fork	WVK-41-D.5	Aluminum (d)	2006
		CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
		pH	2006
Craig Branch	WVK-41-D.5-2	CNA-Biological	2006
Right Fork/Twomile Creek	WVK-41-E	Fecal Coliform	2006
Edens Fork	WVK-41-E-1	CNA-Biological	2006
		Fecal Coliform	2006
Sheldon Rock Branch	WVK-41-E-1-A	Fecal Coliform	2006
Holmes Branch	WVK-41-E-2	CNA-Biological	2006
		Fecal Coliform	2006
Trace Fork	WVK-41-E-2.5	Fecal Coliform	2006
POCATALICO RIVER SUBWATERSHED			
Pocatalico River	WVKP	Dioxin	2000
Heizer Creek	WVKP-1	Iron	2006
Manila Creek	WVKP-1-A	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
		pH	2006
Sulphur Hollow	WVKP-1-A-0.4	Aluminum (d)	2006
		Iron	2006
		pH	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
UMT/Manila Creek RM 2.3	WVKP-1-A-0.48	Aluminum (d)	2006
		Iron	2006
		pH	2006
Washington Hollow	WVKP-1-A-0.5	Iron	2006
Alcocks Hollow	WVKP-1-A-0.6	Aluminum (d)	2006
		Iron	2006
		pH	2006
UNT/Manila Creek RM 3.2	WVKP-1-A-0.8	Iron	2006
Coal Hollow	WVKP-1-A.3	Aluminum (d)	2006
		Iron	2006
		pH	2006
UMT/Heizer Creek RM 2.3	WVKP-1-A.6	Aluminum (d)	2006
		Iron	2006
		pH	2006
Tupper Creek	WVKP-13	Aluminum (d)	2006
		CNA-Biological	2006
		Fecal Coliform	2006
		Iron	2006
		pH	2006
Legg Fork	WVKP-13-A	Fecal Coliform	2006
Sigman Fork	WVKP-13-A-1	Fecal Coliform	2006
Union Fork	WVKP-13-C.5	Aluminum (d)	2006
		Fecal Coliform	2006
		Iron	2006
		pH	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Rock Branch	WVKP-13-C.5-1	Aluminum (d)	2006
		Fecal Coliform	2006
		Iron	2006
		pH	2006
Flat Fork	WVKP-33	PCBs	2001

NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002

Stream Name	Stream Code	Criteria	TMDL Date
Slaughterhouse Run	WVPNB-10	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
Montgomery Run	WVPNB-11	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
		pH	2006
UNT/Montgomery Run RM 1.40	WVPNB-11-A	Aluminum (d)	2006
		pH	2006
Piney Swamp Run	WVPNB-12	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
		pH	2006
UNT/Piney Swamp Run RM 0.76	WVPNB-12-B	Aluminum (d)	2006
		Iron	2006
		pH	2006
UMT/Piney Swamp Run RM 1.80	WVPNB-12-E	Aluminum (d)	2006
		Iron	2006
		pH	2006
UNT/Piney Swamp Run RM 2.19	WVPNB-12-F	Aluminum (d)	2006
		Iron	2006
		pH	2006

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Abram Creek	WVPNB-16	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
		pH	2006
UNT/Abram Creek RM 1.97	WVPNB-16-0.5A	CNA-Biological	2006
Emory Creek	WVPNB-16-A	Aluminum (d)	2006
		CNA-Biological	2006
		Iron	2006
		pH	2006
UNT/Emory Creek RM 0.78	WVPNB-16-A-1	Aluminum (d)	2006
		pH	2006
Glade Run	WVPNB-16-B.5	Aluminum (d)	2006
		Iron	2006
		pH	2006
UNT/Glade Run RM 0.30	WVPNB-16-B.5-1	Aluminum (d)	2006
		Iron	2006
		pH	2006
Laurel Run	WVPNB-16-C	Aluminum (d)	2006
		Iron	2006
		pH	2006
UNT/Abram Creek RM 13.49	WVPNB-16-C.4	Aluminum (d)	2006
		Iron	2006
		pH	2006
UMT/Abram Creek RM 15.95	WVPNB-16-C.8	Aluminum (d)	2006
		Iron	2006
		pH	2006
Little Creek	WVPNB-16-D	Aluminum (d)	2006
		Iron	2006
		pH	2006

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Stony River	WVPNB-17	Iron	2001
		pH	2001
Laurel Run	WVPNB-17-B.5	pH	2001
Fourmile Run	WVPNB-17-C	Iron	2001
		pH	2001
Laurel Run	WVPNB-17-D	Iron	2001
		pH	2001
Helmick Run	WVPNB-17-E	Iron	2001
		pH	2001
Little Buffalo Creek	WVPNB-19-A	Aluminum (trout)	2006
		Iron (trout) AQ, HH	2006
		pH	2006
Elk Run	WVPNB-22-A	Iron	2006

TYGART VALLEY WATERSHED - HUC# 05020001

Stream Name	Stream Code	Criteria	TMDL Date
Tygart Valley River	WVMT	Iron	2001
		Manganese	2001
		pH	2001
Goose Creek	WVMT-4	Iron	2001
		pH	2001
Lost Run	WVMT-5	Iron	2001
		pH	2001
Berkely Run	WVMT-11	Iron	2001
		pH	2001
Shelby Run	WVMT-11-A	Iron	2001
		pH	2001
Long Run	WVMT-11-B	Iron	2001
		pH	2001

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Berry Run	WVMT-11-B-1	Iron	2001
		pH	2001
Three Fork Creek	WVMT-12	Iron	2001
		pH	2001
Raccoon Creek	WVMT-12-C	Iron	2001
		pH	2001
Little Racoon Creek	WVMT-12-C-2	Iron	2001
Brains Creek	WVMT-12-G-2	Iron	2001
		pH	2001
Birds Creek	WVMT-12-H	Iron	2001
		pH	2001
Squires Creek	WVMT-12-H-1	Iron	2001
		pH	2001
Sandy Creek	WVMT-18	Iron	2001
		pH	2001
Glade Run	WVMT-18-C	Iron	2001
		pH	2001
Little Sandy Creek	WVMT-18-E	Iron	2001
		pH	2001
Maple Run	WVMT-18-E-1	Iron	2001
		pH	2001
Left Fork/Little Sandy Creek	WVMT-18-E-3	Iron	2001
		pH	2001
Left Fork/Sandy Creek	WVMT-18-G	Iron	2001
Frost Run	WVMT-24-A	Iron	2001
		pH	2001
Fords Run	WVMT-27	Iron	2001
		pH	2001

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Anglins Run	WVMT-29	Iron	2001
		pH	2001
Island Run	WVMT-36	Iron	2001
		Manganese	2001
		pH	2001
Beaver Creek	WVMT-37	Iron	2001
		Manganese	2001
		pH	2001
Laurel Run	WVMT-39	Iron (trout)	2001
		pH	2001
UNT/Tygart Valley River RM 75.2	WVMT-40.5	Iron	2001
		pH	2001
Grassy Run	WVMT-41	Iron	2001
		pH	2001
Roaring Creek	WVMT-42	Iron	2001
		pH	2001
BUCKHANNON RIVER SUBWATERSHED			
Buckhannon River	WVMTB	Iron (trout) AQ	1998
Pecks Run	WVMTB-5	Iron	2001
		pH	2001
UNT/Pecks Run RM 2.24	WVMTB-5-0.8A	Iron	2001
		pH	2001
Little Pecks Run	WVMTB-5-B	Iron	2001
Mud Run	WVMTB-5-C	Iron	2001
Turkey Run	WVMTB-10	Iron	2001
		pH	2001
Sugar Run	WVMTB-10-A	Iron	2001
Fink Run	WVMTB-11	Iron	2001
		pH	2001

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Mud Lick Run	WVMTB-11-B	Iron	2001
Bridge Run	WVMTB-11-B.7	Iron	2001
		pH	2001
Bull Run	WVMTB-18-B	Iron	2001
Blacklick Run	WVMTB-18-B-2	Iron	2001
Mudlick Run	WVMTB-18-B-3	Iron	2001
Tenmile Creek	WVMTB-25	Iron (trout) AQ	1998
Panther Fork	WVMTB-27	pH	2001
Swamp Run	WVMTB-29	Iron	2001
		pH	2001
Herods Run	WVMTB-30	pH	2001
Left Fork/Buckhannon River	WVMTB-32	Iron (trout) AQ	1998
MIDDLE FORK RIVER SUBWATERSHED			
Middle Fork River	WVMTM	pH	2001
Devil Run	WVMTM-4	Iron	2001
		pH	2001
Hell Run	WVMTM-6	Iron	2001
		pH	2001
Whiteoak Run	WVMTM-8	Iron	2001
		pH	2001
Cassity Fork	WVMTM-16	Iron	2001
		pH	2001
Panther Run	WVMTM-16-A	Iron	2001
		pH	2001

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

HYDROLOGIC GROUP C

GAULEY WATERSHED - HUC# 05050005

Stream Name	Stream Code	Criteria	TMDL Date
Scrabble Creek	WVKG-1	Fecal Coliform	2008
Twentymile Creek	WVKG-5	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
		pH	2008
Buckles Branch	WVKG-5-A	Iron	2008
Bells Creek	WVKG-5-B	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Open Fork	WVKG-5-B-1	Aluminum (d)	2008
		CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
		pH	2008
Williams Hollow	WVKG-5-B-1-B	Aluminum (d)	2008
		pH	2008
Sangamore Fork	WVKG-5-B-1-C	Aluminum (d)	2008
		CNA-Biological	2008
		Iron	2008
		pH	2008
Smith Branch	WVKG-5-B-2	Fecal Coliform	2008
Hughes Fork	WVKG-5-B-4	Iron	2008
		Selenium	2008
Rockcamp Fork	WVKG-5-B-5	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Campbell Fork	WVKG-5-B-7	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Rockcamp Fork	WVKG-5-F	Aluminum (d)	2008
		CNA-Biological	2008
		pH	2008
Spring Branch	WVKG-5-F-1	Aluminum (d)	2008
		CNA-Biological	2008
		Iron	2008
		pH	2008
Lilly Branch	WVKG-5-G	Iron	2008
Hardway Branch	WVKG-5-K	Iron	2008
UNT/Hardway Branch RM 1.00	WVKG-5-K-2	Iron	2008
Boardtree Branch	WVKG-5-M	Iron	2008
Sugarcamp Branch	WVKG-5-N	Iron	2008
Stillhouse Branch	WVKG-5-O	Iron	2008
Robinson Fork	WVKG-5-P	Iron	2008
UNT/Robinson Fork RM 1.23	WVKG-5-P-4	Iron	2008
UNT/Twentymile Creek RM 17.20	WVKG-5-P.5	Iron	2008
Rader Fork	WVKG-5-R	Iron	2008
Rich Creek	WVKG-6	Fecal Coliform	2008
		Iron (trout) AQ, HH	2008
Lick Branch	WVKG-6-A	Fecal Coliform	2008
Bridge Fork	WVKG-6-B	Iron	2008
Kelly Fork	WVKG-6-D	Fecal Coliform	2008
Peters Creek	WVKG-13	Fecal Coliform	2008
		Iron (trout) AQ, HH	2008
Otter Creek	WVKG-13-B	Fecal Coliform	2008
		Iron	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Line Creek	WVKG-13-C	Fecal Coliform	2008
Right Fork/Line Creek	WVKG-13-C-1	Iron	2008
UNT/Line Creek RM 1.31	WVKG-13-C-3	Aluminum (d)	2008
		pH	2008
Laurel Creek	WVKG-13-E	Fecal Coliform	2008
Jerry Fork	WVKG-13-F	Iron	2008
Jones Branch	WVKG-13-G	Fecal Coliform	2008
		Iron	2008
Keenan Branch	WVKG-13-H	Fecal Coliform	2008
Whitewater Branch	WVKG-13-J	Fecal Coliform	2008
Buck Garden Creek	WVKG-13-K	Fecal Coliform	2008
		Iron	2008
Hutchison Branch	WVKG-13-K-1	Fecal Coliform	2008
		Iron	2008
Rockcamp Branch	WVKG-13-L	Iron	2008
McClung Branch	WVKG-13-M	Fecal Coliform	2008
		Iron	2008
Pine Run	WVKG-13-N	Iron (trout) AQ	2008
Bryant Branch	WVKG-13-O	Iron	2008
Sewell Creek	WVKG-19-Q	Fecal Coliform	2008
		Iron	2008
Little Sewell Creek	WVKG-19-Q-1	Fecal Coliform	2008
		Iron	2008
Boggs Creek	WVKG-19-Q-1-A	Iron	2008
Briery Creek	WVKG-19-U-2-A	Aluminum (d) (trout)	2008
		pH	2008
Little Clear Creek	WVKG-19-V	Iron (trout) AQ, HH	2008
		pH	2008
Beaver Creek	WVKG-19-V-1	Iron	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Stony Run	WVKG-19-V-2	Iron	2008
Rader Run	WVKG-19-V-3	Iron	2008
UNT/Little Clear Creek RM 7.5	WVKG-19-V-3.8	Iron	2008
Cutlip Branch	WVKG-19-V-4	Iron	2008
Laurel Creek	WVKG-19-V-5	Iron (trout)	2008
		pH	2008
Kuhn Branch	WVKG-19-V-7	Iron (trout) AQ	2008
Joe Knob Branch	WVKG-19-V-7-A	Iron	2008
Hominy Creek	WVKG-24	Iron (trout) AQ	2008
Brushy Meadow Creek	WVKG-24-E-2	Fecal Coliform	2008
		Iron (trout) AQ, HH	2008
UNT/Brushy Meadow Creek RM 1.32	WVKG-24-E-2-B	Fecal Coliform	2008
Colt Branch	WVKG-24-I	Iron	2008
Jones Run	WVKG-26-B-2	CNA-Biological	2008
		Fecal Coliform	2008
Duffy Branch	WVKG-26-C	Iron	2008
Phillips Run	WVKG-26-D	Iron	2008
Enoch Branch	WVKG-26-H	Iron	2008
McMillion Creek	WVKG-26-I	Iron	2008
Brushy Fork	WVKG-26-K	Iron (trout)	2008
Lower Spruce Run	WVKG-26-K-1	Iron	2008
Spruce Run	WVKG-26-K-1-A	Aluminum (d)	2008
		Iron	2008
		pH	2008
Falls Run	WVKG-26-O-2	pH	2008
Laurel Fork	WVKG-26-P	Iron	2008
Big Beaver Creek	WVKG-30	Fecal Coliform	2008
Wyatt Run	WVKG-30-D	Fecal Coliform	2008
Little Beaver Creek	WVKG-30-E	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Little Beaver Creek RM 4.0	WVKG-30-E-4	Fecal Coliform	2008
		Iron	2008
Left Fork/Big Beaver Creek	WVKG-30-H	Fecal Coliform	2008
Paddy Run	WVKG-30-K	Iron	2008
Bearpen Fork	WVKG-30-L	CNA-Biological	2008
		Iron	2008
Upper Laurel Run	WVKG-30-P	Aluminum (d)	2008
		pH	2008
Little Laurel Creek	WVKG-31	pH	2008
UNT/Little Laurel Creek RM 1.12	WVKG-31-B	pH	2008
UNT/Little Laurel Creek RM 1.89	WVKG-31-C	pH	2008
Panther Creek	WVKG-32	Aluminum (d) (trout)	2008
		Iron (trout)	2008
Nettle Run	WVKG-32-I	Iron	2008
Cranes Nest Run	WVKG-32-J	Iron (trout)	2008
Windy Run	WVKG-34-H-8	pH	2008
Armstrong Run	WVKG-34-H-9	pH	2008
Carpenter Run	WVKG-34-H-11.5	pH	2008
Turkey Creek	WVKG-60	pH	2008
Right Fork/Turkey Creek	WVKG-60-A	pH	2008
Big Run	WVKG-70	pH	2008
CRANBERRY RIVER SUBWATERSHED			
Barrenshe Run	WVKGC-4	pH	2008
Aldrich Branch	WVKGC-9	pH	2008
Lick Branch	WVKGC-14	pH	2008
Little Rough Run	WVKGC-17.3	pH	2008
Cold Run	WVKGC-18	pH	2008
Dogway Fork	WVKGC-19	pH	2008
Birchlog Run	WVKGC-21	pH	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Tumbling Rock Run	WVKGC-22	pH	2008
North Fork/Cranberry River	WVKGC-24	pH	2008
Left Fork/North Fork/Cranberry River	WVKGC-24-C	pH	2008
WILLIAMS RIVER SUBWATERSHED			
Craig Run	WVKGW-1	pH	2008
Middle Fork/Williams River	WVKGW-10	pH	2008
Kens Creek	WVKGW-18	pH	2008
Tea Creek	WVKGW-20	pH	2008
Sugar Creek	WVKGW-21	pH	2008
UNT/Sugar Creek RM 2.5	WVKGW-21-B	pH	2008

LOWER GUYANDOTTE WATERSHED - HUC# 05070102

Stream Name	Stream Code	Criteria	TMDL Date
Guyandotte River (Lower)	WVOG-lo	Fecal Coliform	2004
		Iron	2004
Right Fork/Merritt Creek	WVOG-10-A	CNA-Biological	2004
		Iron	2004
Limestone Branch	WVOG-48	Iron	2004
		pH	2004
Big Creek	WVOG-49	Aluminum (d)	2004
Ed Stone Branch	WVOG-49-A	CNA-Biological	2004
		Iron	2004
		pH	2004
North Branch/Ed Stone Branch	WVOG-49-A-1	Iron	2004
		pH	2004
Crawley Creek	WVOG-51	Aluminum (d)	2004
Godby Branch	WVOG-53	CNA-Biological	2004
		Iron	2004
		Manganese	2004
		pH	2004

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Buffalo Creek	WVOG-61	Aluminum (d)	2004
		Iron	2004
		Manganese	2004
		pH	2004
Right Fork/Buffalo Creek	WVOG-61-A	Iron	2004
		pH	2004
MUD RIVER SUBWATERSHED			
Mud River	WVOGM	CNA-Biological	2004
		Selenium	2004
Sugartree Branch	WVOGM-47	CNA-Biological	2004
		Selenium	2004
Stanley Fork	WVOGM-48	CNA-Biological	2004
		Selenium	2004

MIDDLE OHIO NORTH WATERSHED - HUC# 05030201

Ohio River (Middle North)	WVO-mn	PCBs	2002

MIDDLE OHIO SOUTH WATERSHED - HUC# 05030202

Ohio River (Middle South)	WVO-ms	Dioxin	2000
		PCBs	2002
Turkey Run Lake	WVO-37-(L1)	Iron	1999
		Sedimentation/Siltation	1999
		Trophic State Index	1999

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
POTOMAC DIRECT DRAINS WATERSHED - HUC# 02070004			
Elks Run	WVP-1	CNA-Biological	2008
		Fecal Coliform	2008
Elk Branch	WVP-1-A	CNA-Biological	2008
		Fecal Coliform	2008
UNT/Potomac River RM 199.27	WVP-2.2	CNA-Biological	2008
		Fecal Coliform	2008
Opequon Creek	WVP-4	CNA-Biological	2008
		Fecal Coliform	2008
Hoke Run	WVP-4-A	CNA-Biological	2008
		Fecal Coliform	2008
Eagle Run	WVP-4-B	CNA-Biological	2008
		Fecal Coliform	2008
Tuscarora Creek	WVP-4-C	CNA-Biological	2008
		Fecal Coliform	2008
Dry Run	WVP-4-C-1	CNA-Biological	2008
		Fecal Coliform	2008
Evans Run	WVP-4-D	CNA-Biological	2008
Shaw Run	WVP-4-F	CNA-Biological	2008
		Fecal Coliform	2008
Buzzard Run	WVP-4-H	Fecal Coliform	2008
Hopewell Run	WVP-4-I	CNA-Biological	2008
		Fecal Coliform	2008
UNT/Hopewell Run RM 1.85	WVP-4-I-2	Fecal Coliform	2008
Middle Creek	WVP-4-J	CNA-Biological	2008
		Fecal Coliform	2008
Goose Creek	WVP-4-J-1	Fecal Coliform	2008
Three Run	WVP-4-L	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Mill Creek	WVP-4-M	CNA-Biological	2008
		Fecal Coliform	2008
Sylvan Run	WVP-4-M-1	CNA-Biological	2008
Torytown Run	WVP-4-M-2	CNA-Biological	2008
		Fecal Coliform	2008
Turkey Run	WVP-4-N	CNA-Biological	2008
		Fecal Coliform	2008
Silver Spring Run	WVP-4-P	CNA-Biological	2008
		Fecal Coliform	2008
Jordan Run	WVP-4.5	Fecal Coliform	2008
Harlan Run	WVP-5	CNA-Biological	2008
		Fecal Coliform	2008
Tulissus Branch	WVP-5-A	CNA-Biological	2008
		Fecal Coliform	2008
Sleepy Creek	WVP-9	Fecal Coliform	2008
Indian Run	WVP-9-G	Fecal Coliform	2008

TUG FORK WATERSHED - HUC# 05070201

Stream Name	Stream Code	Criteria	TMDL Date
Tug Fork	WVBST	Iron	2002
Powdermill Branch	WVBST-3	Iron	2002
Pigeon Creek	WVBST-24	Iron	2002
		pH	2002
Millstone Branch	WVBST-24-O	Iron	2002
Sugartree Creek	WVBST-32	Iron	2002
Williamson Creek	WVBST-33	Iron	2002
Sprouse Creek	WVBST-38	Iron	2002
Rutherford Branch	WVBST-40-B	Iron	2002
		pH	2002
Mitchell Branch	WVBST-40-C	Iron	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Chafin Branch	WVBST-40-D	Iron	2002
Thacker Creek	WVBST-42	Iron	2002
		Manganese	2002
		pH	2002
Scissorsville Branch	WVBST-42-A	Iron	2002
		Manganese	2002
		pH	2002
Mauchlinville Branch	WVBST-42-B	Iron	2002
		Manganese	2002
		pH	2002
Grapevine Creek	WVBST-43	Iron	2002
		Manganese	2002
Lick Fork	WVBST-43-A	Iron	2002
Panther Creek	WVBST-60	Iron	2002
Cub Branch	WVBST-60-D	Iron	2002
Grapevine Branch	WVBST-70-F	Iron	2002
Beartown Branch	WVBST-70-I	Iron	2002
Atwell Branch	WVBST-70-O	Iron	2002
Clear Fork	WVBST-76	Iron	2002
Shabbyroom Branch	WVBST-78-B	Iron	2002
Honeycamp Branch	WVBST-78-D	Iron	2002
Coontree Branch	WVBST-78-E	Iron	2002
Stonecoal Branch	WVBST-78-F	Iron	2002
Badway Branch	WVBST-78-G	Iron	2002
Newson Branch	WVBST-78-H	Iron	2002
Moorecamp Branch	WVBST-78-I	Iron	2002
Left Fork/Davy Branch	WVBST-85-A	Iron	2002
Shannon Branch	WVBST-94	Iron	2002
Upper Shannon Branch	WVBST-95	Iron	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Puncheoncamp Branch	WVBST-98-A	Iron	2002
Little Indian Creek	WVBST-100	Iron	2002
Jed Branch	WVBST-102	Iron	2002
Rock Narrows Branch	WVBST-103	Iron	2002
Harris Branch	WVBST-104	Iron	2002
Mitchell Branch	WVBST-105	Iron	2002
Sugarcamp Branch	WVBST-106	Iron	2002
Grapevine Branch	WVBST-107	Iron	2002
Sandlick Creek	WVBST-109	Iron	2002
Right Fork/Sandlick Creek	WVBST-109-A	Iron	2002
Left Fork/Sandlick Creek	WVBST-109-B	Iron	2002
Adkin Branch	WVBST-110	Iron	2002
Belcher Branch	WVBST-111	Iron	2002
Turnhole Branch	WVBST-112	Iron	2002
Harmon Branch	WVBST-113	Iron	2002
South Fork/Tug Fork	WVBST-115	Iron	2002
Tea Branch	WVBST-115-A	Iron	2002
McClure Branch	WVBST-115-B	Iron	2002
Jump Branch	WVBST-115-D	Iron	2002
Spice Creek	WVBST-115-E	Iron	2002
Laurel Branch	WVBST-115-F	Iron	2002
Road Fork	WVBST-115-G	Iron	2002
Belcher Branch	WVBST-116	Iron	2002
Loop Branch	WVBST-117	Iron	2002

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Mill Branch	WVBST-118	Iron	2002
Dry Branch	WVBST-119	Iron	2002
Little Creek	WVBST-120	Iron	2002
Indian Grave Branch	WVBST-120-A	Iron	2002
Puncheoncamp Branch	WVBST-120-B	Iron	2002
Millseat Branch	WVBST-121	Iron	2002
Ballard Harmon Branch	WVBST-122	Iron	2002
Sams Branch	WVBST-123	Iron	2002

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

HYDROLOGIC GROUP D

GREENBRIER WATERSHED - HUC# 05050003

Stream Name	Stream Code	Criteria	TMDL Date
Greenbrier River	WVKNG	Fecal Coliform	2008
Big Creek	WVKNG-3	Fecal Coliform	2008
Hungard Creek	WVKNG-13	Fecal Coliform	2008
Kelly Creek	WVKNG-15	Fecal Coliform	2008
Flint Hollow	WVKNG-15-A	Fecal Coliform	2008
Wolf Creek	WVKNG-18	Fecal Coliform	2008
Laurel Creek	WVKNG-18-A	Fecal Coliform	2008
Broad Run	WVKNG-18-B	Fecal Coliform	2008
Muddy Creek	WVKNG-22	Fecal Coliform	2008
Mill Creek	WVKNG-22-A	Fecal Coliform	2008
Kitchen Creek	WVKNG-22-C	Fecal Coliform	2008
UNT/Muddy Creek RM 20.10	WVKNG-22-E	Fecal Coliform	2008
Sinking Creek	WVKNG-22-E-1-(S)	Fecal Coliform	2008
Hughart Creek	WVKNG-22-E-1-A-(S)	Fecal Coliform	2008
Milligan Creek	WVKNG-22.7-A-1-(S)	Fecal Coliform	2008
Second Creek	WVKNG-23	Fecal Coliform	2008
Back Creek	WVKNG-23-H	Fecal Coliform	2008
Kitchen Creek	WVKNG-23-G	Fecal Coliform	2008
Monroe Draft	WVKNG-25-A	Fecal Coliform	2008
Little Creek	WVKNG-28-D	Fecal Coliform	2008
Whites Draft	WVKNG-28-F	Fecal Coliform	2008
UNT/Whites Draft RM 2.00	WVKNG-28-F-2	Fecal Coliform	2008
Meadow Creek	WVKNG-28-Q	Fecal Coliform	2008
Spring Creek	WVKNG-30	Fecal Coliform	2008
Beaver Creek	WVKNG-47	Fecal Coliform	2008
Swago Creek	WVKNG-49	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Knapp Creek	WVKNG-53	Fecal Coliform	2008
Browns Creek	WVKNG-53-D	Fecal Coliform	2008
Douthat Creek	WVKNG-53-H	Fecal Coliform	2008
Stony Creek	WVKNG-55	Fecal Coliform	2008
Indian Draft	WVKNG-55-A	Fecal Coliform	2008
Thorny Creek	WVKNG-59	Fecal Coliform	2008
UNT/Thorny Creek RM 9.27	WVKNG-59-E	Fecal Coliform	2008
Cloverlick Creek	WVKNG-61	Fecal Coliform	2008
Shock Run	WVKNG-66-D	Fecal Coliform	2008
Galford Run	WVKNG-66-E	Fecal Coliform	2008
Deer Creek	WVKNG-68	Fecal Coliform	2008
Buffalo Run	WVKNG-68-F	Fecal Coliform	2008
Allegheny Run	WVKNG-75	Fecal Coliform	2008

JAMES WATERSHED - HUC# 2080201

Stream Name	Stream Code	Criteria	TMDL Date
South Fork/Potts Creek	WVJ-1-E	Fecal Coliform	2008
Ray Fork	WVJ-1-E-1	CNA-Biological	2008
		Fecal Coliform	2008
UNT/Sweet Springs Creek RM 5.55	WVJ-2-H	Fecal Coliform	2008

LITTLE KANAWHA WATERSHED - HUC# 05030203

Stream Name	Stream Code	Criteria	TMDL Date
Little Kanawha River	WVLK	Iron	2000
Mountwood Park Lake	WVLK-10-(L1)	Sedimentation/Siltation	1998
Reedy Creek	WVLK-25	Iron	2000
Spring Creek	WVLK-31	Iron	2000
Duck Creek	WVLK-82	CNA-Biological	2008
		Iron	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Lynch Run	WVLK-85	CNA-Biological	2008
		Iron	2008
		Fecal Coliform	2008
		Manganese	2008
UNT/Lynch Run RM 0.91	WVLK-85-C	Iron	2008
Sand Fork	WVLK-86	Iron	2000
Duskcamp Run	WVLK-88	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Right Fork/Duskcamp Run	WVLK-88-A	CNA-Biological	2008
		Iron	2008
Copen Run	WVLK-90	Fecal Coliform	2008
Saltlick Creek	WVLK-95	Iron	2000
Saltlick Pond 9	WVLK-95-(L1)	Sedimentation/Siltation	2000

LOWER NEW WATERSHED - HUC# 05050004

Stream Name	Stream Code	Criteria	TMDL Date
New River (Lower)	WVKN-lo	Fecal Coliform	2008
Laurel Creek	WVKN-5	Fecal Coliform	2008
Mill Creek	WVKN-7	Fecal Coliform	2008
UNT/Mill Creek RM 1.71	WVKN-7-0.5A	Fecal Coliform	2008
Osborne Creek	WVKN-7-B	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
UNT/Osborne Creek RM 0.62	WVKN-7-B-0.3	Fecal Coliform	2008
Marr Branch	WVKN-9	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Marr Branch RM 1.00	WVKN-9-A	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Wolf Creek	WVKN-10	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
House Branch	WVKN-10-A	Fecal Coliform	2008
Crooked Run	WVKN-10-B	Fecal Coliform	2008
Short Creek	WVKN-10-C	Fecal Coliform	2008
UNT/Wolf Creek RM 9.08	WVKN-10-M	Aluminum (d)	2008
		Iron	2008
		pH	2008
Keeney Creek	WVKN-15	Fecal Coliform	2008
Coal Run	WVKN-16	Fecal Coliform	2008
Floyd Creek	WVKN-17-B	Aluminum (d)	2008
		CNA-Biological	2008
		Iron	2008
		pH	2008
Arbuckle Creek	WVKN-21	CNA-Biological	2008
		Fecal Coliform	2008
		Iron (trout) AQ	2008
Rocklick Creek	WVKN-21-A	Fecal Coliform	2008
Dunloup Creek	WVKN-22	Fecal Coliform	2002
		Iron	2002
		Iron (trout) AQ	2002
Meadow Fork	WVKN-22-B	Iron	2002
		pH	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Mill Creek	WVKN-22-K	Aluminum (d)	2008
		CNA-Biological	2008
		Iron	2008
		pH	2008
Piney Creek	WVKN-26	Fecal Coliform	2008
		Iron (trout) AQ	2008
Batoff Creek	WVKN-26-A	Aluminum (d)	2008
		Iron (trout) AQ, HH	2008
		pH	2008
Cranberry Creek	WVKN-26-E	CNA-Biological	2008
		Fecal Coliform	2008
		Iron (trout) AQ, HH	2008
Little Whitestick Creek	WVKN-26-E-1	Fecal Coliform	2008
Beaver Creek	WVKN-26-F	CNA-Biological	2008
		Fecal Coliform	2008
		Iron (trout) AQ	2008
Little Beaver Creek	WVKN-26-F-2	CNA-Biological	2008
		Fecal Coliform	2008
Whitestick Creek	WVKN-26-G	CNA-Biological	2008
		Fecal Coliform	2008
Soak Creek	WVKN-26-K	Fecal Coliform	2008
Bowyer Creek	WVKN-26-M	Fecal Coliform	2008
		Iron	2008
Laurel Creek	WVKN-26-N	Fecal Coliform	2008
		Iron	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Glade Creek	WVKN-29	CNA-Biological	2008
		Fecal Coliform	2008
Meadow Creek	WVKN-32	Fecal Coliform	2008
Brooks Branch	WVKN-42	Fecal Coliform	2008
Madam Creek	WVKN-44	Fecal Coliform	2008
Beech Run	WVKN-45	Fecal Coliform	2008

MONONGAHELA WATERSHED - HUC# 05020003

Stream Name	Stream Code	Criteria	TMDL Date
Camp Run	WVM-2.1	Iron	2002
		pH	2002
UNT/Monongahela River RM 93.07	WVM-2.6	Iron	2002
		pH	2002
Laurel Run	WVM-2.7	Iron	2002
		pH	2002
West Run	WVM-3	Iron	2002
		pH	2002
Robinson Run	WVM-4	Iron	2002
		pH	2002
Crafts Run	WVM-4-A	Iron	2002
		pH	2002
UNT/Robinson Run RM 1.09	WVM-4-B	Iron	2002
		pH	2002
Scotts Run	WVM-6	Iron	2002
Dents Run	WVM-7	Iron	2002
UNT/Dents Run RM 3.60	WVM-7-C	Iron	2002
		pH	2002
Deckers Creek	WVM-8	Iron	2002
		pH	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Hartman Run	WVM-8-0.5A	Iron	2002
		pH	2002
UNT/Deckers Creek RM 5.70	WVM-8-A.7	Iron	2002
		pH	2002
Glady Run	WVM-8-D	Iron	2002
		pH	2002
Slabcamp Run	WVM-8-F	Iron	2002
		pH	2002
Dillan Creek	WVM-8-G	Iron	2002
Laurel Run/Deckers Creek	WVM-8-H	Iron	2002
		pH	2002
Kanes Creek	WVM-8-I	Iron	2002
		pH	2002
Cobun Creek	WVM-9	pH	2002
Booths Creek	WVM-10	Iron	2002
		Manganese	2002
		pH	2002
Owl Creek	WVM-10-D	Iron	2002
		pH	2002
Mays Run	WVM-10-E	Iron	2002
		pH	2002
UNT/Booths Creek RM 6.27	WVM-10-F	Iron	2002
		pH	2002
Brand Run	WVM-11	Iron	2002
		Manganese	2002
		pH	2002
Flaggy Meadow Run	WVM-14	Iron	2002
Birchfield Run	WVM-15	Iron	2002
		pH	2002

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Parker Run	WVM-20	Iron	2002
		pH	2002
UNT/Monongahela River RM 123.45	WVM-20.2	Iron	2002
		pH	2002
Pharaoh Run	WVM-21	Iron	2002
Robinson Run	WVM-22-C	Iron	2002
		pH	2002
Sugar Run	WVM-22-K	Iron	2002
		Manganese	2002
		pH	2002
Mod Run	WVM-23-K	Iron	2002
Fleming Fork	WVM-23-N-1	Iron	2002
Whetstone Run	WVM-23-Q	Iron	2002
Whetstone Run	WVM-23-Q	pH	2002
Joes Run	WVM-23-R	Iron	2002
		pH	2002
UMT/Monongahela River RM 126.94	WVM-22.9	Iron	2001
UNT/Monongahela River RM 128.55	WVM-25.9	Iron	2002
		pH	2002

UPPER NEW WATERSHED - HUC# 05050002

Stream Name	Stream Code	Criteria	TMDL Date
Indian Creek	WVKN-51	CNA-Biological	2008
		Fecal Coliform	2008
Bradshaw Creek	WVKN-51-A	Fecal Coliform	2008
Stinking Lick Creek	WVKN-51-B	Fecal Coliform	2008
Hans Creek	WVKN-51-D	Fecal Coliform	2008
Indian Draft	WVKN-51-G	Fecal Coliform	2008
UNT/Indian Draft RM 1.46	WVKN-51-G-1	Fecal Coliform	2008
Laurel Creek	WVKN-51-H-(S)	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Cooks Run	WVKN-51-I	Fecal Coliform	2008
Rock Camp Creek	WVKN-51-K	Fecal Coliform	2008
Turkey Creek	WVKN-51-O	Fecal Coliform	2008
Gin Hollow	WVKN-51-R	Fecal Coliform	2008
Burnside Branch	WVKN-51-S-1-(S)	Fecal Coliform	2008
Adair Run	WVKN-59	Fecal Coliform	2008
East River	WVKN-60	Fecal Coliform	2008
Fivemile Creek	WVKN-60-C	Fecal Coliform	2008
Possum Hollow	WVKN-60-C-2	Fecal Coliform	2008
Hales Branch	WVKN-60-C-3	Fecal Coliform	2008
Payne Branch	WVKN-60-C-4	Fecal Coliform	2008
Rich Creek	WVKN-61	Fecal Coliform	2008
Brush Creek	WVKN-61-A	Fecal Coliform	2008
Scott Branch	WVKN-61-B	Fecal Coliform	2008
Crooked Creek	WVKN-61-C	Fecal Coliform	2008
Mud Run	WVKN-61-D	Fecal Coliform	2008
Dry Creek	WVKN-61-E	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Painter Run	WVKN-61-E-1	Fecal Coliform	2008
BLUESTONE RIVER SUBWATERSHED			
Bluestone River	WVKNB	CNA-Biological	2008
		Fecal Coliform	2008
Pipestem Creek	WVKNB-1	Fecal Coliform	2008
Suck Creek	WVKNB-3-A	Fecal Coliform	2008
UNT/Jumping Branch RM 1.99	WVKNB-3-C-1-D	Fecal Coliform	2008
UNT/Jumping Branch RM 2.48	WVKNB-3-C-1-E	Fecal Coliform	2008
Mountain Creek	WVKNB-5	Fecal Coliform	2008
North Fork/Mountain Creek	WVKNB-5-B	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Brush Creek	WVKNB-12	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Laurel Creek	WVKNB-12-B	Fecal Coliform	2008
Glady Fork	WVKNB-12-H	Fecal Coliform	2008
South Fork/Brush Creek	WVKNB-12-J	Fecal Coliform	2008
Middle Fork/South Fork/Brush Creek	WVKNB-12-J-2	Fecal Coliform	2008
Camp Creek	WVKNB-13	Fecal Coliform	2008
Wolf Creek	WVKNB-15	Fecal Coliform	2008
Rich Creek	WVKNB-18	Fecal Coliform	2008
		Iron	2008
Blacklick Creek	WVKNB-22	Fecal Coliform	2008
Rocky Branch	WVKNB-22-A	Fecal Coliform	2008
Barn Branch	WVKNB-22-C	Fecal Coliform	2008
Widemouth Creek	WVKNB-28	Fecal Coliform	2008
Righthand Fork/Widemouth Creek	WVKNB-28-B	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Lefthand Fork/Widemouth Creek	WVKNB-28-C	Fecal Coliform	2008
Crane Creek	WVKNB-30	CNA-Biological	2008
		Fecal Coliform	2008
		Iron (trout) AQ	2008
Belcher Branch	WVKNB-30-C	Iron	2008
UNT/Crane Creek RM 4.47	WVKNB-30-D.5	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Simmons Creek	WVKNB-33	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Laurel Fork	WVKNB-34.5	CNA-Biological	2008
		Fecal Coliform	2008
Lick Branch	WVKNB-35	Fecal Coliform	2008
Brush Fork	WVKNB-36	CNA-Biological	2008
		Fecal Coliform	2008
		Iron	2008
Neil Hollow	WVKNB-37	Fecal Coliform	2008

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date

HYDROLOGIC GROUP E

CACAPON WATERSHED - HUC# 02070003

Stream Name	Stream Code	Criteria	TMDL Date
Lost River	WVPC-24	Fecal Coliform	1998

DUNKARD WATERSHED - HUC# 05020005

Stream Name	Stream Code	Criteria	TMDL Date
Dunkard Creek	WVM-1	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Dolls Run	WVM-1-A	CNA-Biological	2009
		Fecal Coliform	2009
Pedlar Run	WVM-1-A-1	CNA-Biological	2009
		Fecal Coliform	2009
UNT/Pedlar Run RM 1.20	WVM-1-A-1-B	Fecal Coliform	2009
Smoky Drain	WVM-1-A-2	CNA-Biological	2009
		Fecal Coliform	2009
Jakes Run	WVM-1-B.1	CNA-Biological	2009
		Fecal Coliform	2009
UNT/Jakes Run RM 2.33	WVM-1-B.1-2	Fecal Coliform	2009
UNT/Jakes Run RM 5.5	WVM-1-B.1-12	Fecal Coliform	2009
Blacks Run	WVM-1-B.3	CNA-Biological	2009
Days Run	WVM-1-C	CNA-Biological	2009
		Fecal Coliform	2009
Shriver Run	WVM-1-C-3	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Building Run	WVM-1-C-3-A	Fecal Coliform	2009

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Days Run RM 5.8	WVM-1-C-4	CNA-Biological	2009
		Fecal Coliform	2009
Roberts Run	WVM-1-D.4	Fecal Coliform	2009
Miracle Run	WVM-1-E	Fecal Coliform	2009
Thomas Run	WVM-1-E-1	Fecal Coliform	2009
Right Branch/Miracle Run	WVM-1-E-2	CNA-Biological	2009
		Fecal Coliform	2009
Scott Run	WVM-1-E-4	Fecal Coliform	2009
West Virginia Fork/Dunkard Creek	WVM-1-F	Chloride	2009
		Fecal Coliform	2009
		Iron	2009
Wise Run	WVM-1-F-3	CNA-Biological	2009
		Fecal Coliform	2009
Range Run	WVM-1-F-5	CNA-Biological	2009
		Fecal Coliform	2009
North Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-6	CNA-Biological	2009
		Fecal Coliform	2009
Camp Run	WVM-1-F-6-A	CNA-Biological	2009
		Fecal Coliform	2009
South Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-7	Chloride	2009
		Fecal Coliform	2009
		Iron	2009
Middle Fork/South Fork/West Virginia Fork/Dunkard Creek	WVM-1-F-7-A	Fecal Coliform	2009
UNT/South Fork RM 3.0/West Virginia Fork	WVM-1-F-7-F	Chloride	2009
Pennsylvania Fork/Dunkard Creek	WVM-1-G	Fecal Coliform	2009

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
LOWER OHIO WATERSHED - HUC# 05090101			
Ohio River (Lower)	WVO-lo	Dioxin	2000
		PCBs	2002
Fourpole Creek	WVO-3	Fecal Coliform	2002
TWELVEPOLE WATERSHED - HUC# 05090102			
Camp Creek	WVO-2-Q-8	Aluminum (d)	2009
		CNA-Biological	2009
		Iron	2009
		pH	2009
UNT/Camp Creek RM 0.50	WVO-2-Q-8-0.5A	Aluminum (d)	2009
		pH	2009
Left Fork/Camp Creek	WVO-2-Q-8-A	Aluminum (d)	2009
		CNA-Biological	2009
		Fecal Coliform	2009
		pH	2009
Tiger Fork	WVO-2-Q-8-A-1	Fecal Coliform	2009
Right Fork/Camp Creek	WVO-2-Q-8-B	Aluminum (d)	2009
		CNA-Biological	2009
		Iron	2009
		pH	2009

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
UPPER GUYANDOTTE WATERSHED - HUC# 05070101			
Guyandotte River (Upper)	WVOG-up	Aluminum (d)	2004
		CNA-Biological	2004
		Fecal Coliform	2004
		Iron	2004
Island Creek	WVOG-65	Aluminum (d)	2004
Coal Branch	WVOG-65-A	CNA-Biological	2004
		Iron	2004
		pH	2004
Copperas Mine Fork	WVOG-65-B	Aluminum (d)	2004
		CNA-Biological	2004
		Iron	2004
		pH	2004
Mud Fork	WVOG-65-B-1	CNA-Biological	2004
		Iron	2004
		pH	2004
Lower Dempsey Branch	WVOG-65-B-1-A	CNA-Biological	2004
		Iron	2004
		pH	2004
Ellis Branch	WVOG-65-B-1-B	CNA-Biological	2004
		Iron	2004
		pH	2004
Upper Dempsey Branch	WVOG-65-B-1-E	CNA-Biological	2004
		Iron	2004
		pH	2004
Trace Fork	WVOG-65-B-4	CNA-Biological	2004
		Iron	2004
		pH	2004
Buffalo Creek	WVOG-75	Aluminum (d)	2004

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Mudlick Branch (Proctor Hollow)	WVOG-75-C.5	CNA-Biological	2004
		Iron	2004
		pH	2004
Huff Creek	WVOG-76	CNA-Biological	2004
		Iron	2004
		Manganese	2004
Toney Fork	WVOG-76-L	CNA-Biological	2004
		Iron	2004
Oldhouse Branch	WVOG-77-A.5	CNA-Biological	2004
		Iron	2004
		Manganese	2004
		pH	2004
Gilbert Creek	WVOG-89	Aluminum (d)	2004
Muzzle Creek	WVOG-92-I	CNA-Biological	2004
		Iron	2004
Buffalo Creek	WVOG-92-K	CNA-Biological	2004
		Iron	2004
		pH	2004
Kezee Fork	WVOG-92-K-1	Iron	2004
Mudlick Fork	WVOG-92-K-2	Iron	2004
Pad Fork	WVOG-92-Q	Iron	2004
Righthand Fork/Pad Fork	WVOG-92-Q-1	Iron	2004
Big Cub Creek	WVOG-96	Aluminum (d)	2004
Sturgeon Branch	WVOG-96-A	Iron	2004
Road Branch	WVOG-96-B	Iron	2004
Elk Trace Branch	WVOG-96-C	Iron	2004
Toler Hollow	WVOG-96-F	CNA-Biological	2004
		Iron	2004
McDonald Fork	WVOG-96-H	Iron	2004

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Reedy Branch	WVOG-99	Iron	2004
Little Cub Creek	WVOG-108	Iron	2004
Indian Creek	WVOG-110	Iron	2004
Brier Creek	WVOG-110-A	Iron	2004
Marsh Fork	WVOG-110-A-2	Iron	2004
Pinnacle Creek	WVOG-124	CNA-Biological	2004
		Iron	2004
		Manganese	2004
Smith Branch	WVOG-124-D	CNA-Biological	2004
		Iron	2004
Laurel Branch/Pinnacle Creek	WVOG-124-H	Iron	2004
Spider Creek	WVOG-124-I	Iron	2004
Cabin Creek	WVOG-127	Iron	2004
Joe Branch	WVOG-128	CNA-Biological	2004
		Iron	2004
Long Branch	WVOG-129	CNA-Biological	2004
		Iron	2004
Still Run	WVOG-130	Iron	2004
Barkers Creek	WVOG-131	CNA-Biological	2004
		Iron	2004
Hickory Branch	WVOG-131-B	Iron	2004
Gooney Otter Creek	WVOG-131-F	Iron	2004
Jims Branch	WVOG-131-F-1	Iron	2004
Noseman Branch	WVOG-131-F-2	Iron	2004
Slab Fork	WVOG-134	Aluminum (d) (trout)	2004
		CNA-Biological	2004
		Iron	2004
		Manganese	2004

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Measle Fork	WVOG-134-D	Iron	2004
		pH	2004
Left Fork/Allen Creek	WVOG-135-A	CNA-Biological	2004
		Iron	2004
Devils Fork	WVOG-137	CNA-Biological	2004
		Iron	2004
Winding Gulf	WVOG-138	Aluminum (d)	2004
		CNA-Biological	2004
		Iron	2004
Stonecoal Creek	WVOG-139	CNA-Biological	2004
		Iron	2004
CLEAR FORK SUBWATERSHED			
Clear Fork	WVOGC	Aluminum (d)	2004
		CNA-Biological	2004
		Iron	2004
Lower Road Branch	WVOGC-12	Iron	2004
Laurel Fork	WVOGC-16	CNA-Biological	2004
		Iron	2004
		Manganese	2004
Milam Fork	WVOGC-16-M	CNA-Biological	2004
		Iron	2004
Trough Fork	WVOGC-16-P	CNA-Biological	2004
		Iron	2004
Toney Fork	WVOGC-19	CNA-Biological	2004
		Iron	2004
Crane Fork	WVOGC-26	CNA-Biological	2004
		Iron	2004

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
UPPER OHIO SOUTH WATERSHED - HUC# 05030106			
Ohio River (Upper South)	WVO-us	PCBs	2002
Fish Run	WVO-81	Fecal Coliform	2009
UNT/Fish Run RM 0.79	WVO-81-B	Fecal Coliform	2009
Grave Creek	WVO-83	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Middle Grave Creek	WVO-83-A	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
McLain Run	WVO-83-A-0.5	Iron	2009
Toms Run	WVO-83-A-1	Fecal Coliform	2009
		Iron	2009
Leach Run	WVO-83-A-1-A	Iron	2009
Little Toms Run	WVO-83-A-1.1	Fecal Coliform	2009
Meetinghouse Hollow	WVO-83-A-1.2	Iron	2009
Bartletts Run	WVO-83-A-1.3	Fecal Coliform	2009
Wells Run	WVO-83-A-1.5	Fecal Coliform	2009
North Fork/Middle Grave Creek	WVO-83-A-1.6	Fecal Coliform	2009
Whitney Run	WVO-83-A-2	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
UNT/Whitney Run RM 0.3	WVO-83-A-2-A	Fecal Coliform	2009
		Iron	2009
UNT/Grave Creek RM 2.41	WVO-83-A.1	Fecal Coliform	2009
Lick Run	WVO-83-B.4	Fecal Coliform	2009
French Run	WVO-83-B.5	Fecal Coliform	2009
Burch Run	WVO-83-C	Fecal Coliform	2009

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
North Fork/Grave Creek	WVO-83-E	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Molleys Hollow	WVO-84-A	Fecal Coliform	2009
Jim Run	WVO-85	CNA-Biological	2009
		Fecal Coliform	2009
Boggs Run	WVO-86	Fecal Coliform	2009
		Iron	2009
Browns Run	WVO-86-A	Fecal Coliform	2009
		Iron	2009
UNT/Boggs Run RM 2.69	WVO-86-C	Chloride	2009
Caldwell Run	WVO-87	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
George Run	WVO-87-A	Fecal Coliform	2009
Wheeling Creek	WVO-88	Fecal Coliform	2009
Long Run	WVO-88-B	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Waddles Run	WVO-88-B-1	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
UNT/Waddles Run RM 1.72	WVO-88-B-1-A	Iron	2009
Pogue Run	WVO-88-B-2	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Little Wheeling Creek	WVO-88-D	Fecal Coliform	2010
		Iron	2009

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Peters Run	WVO-88-D-1	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Middle Wheeling Creek	WVO-88-D-2	Fecal Coliform	2009
		Iron	2009
UNT/Middle Wheeling Creek RM 3.05	WVO-88-D-2-0.4A	Fecal Coliform	2009
Tanyard Run	WVO-88-D-2-0.5A	Fecal Coliform	2009
Laidley Run	WVO-88-D-2-D	Fecal Coliform	2009
Todd Run	WVO-88-D-2-F	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Bear Rock Lake # 1	WVO-88-D-2-F-(L1)	Oxygen, Dissolved	1999
		Sedimentation/Siltation	1999
		Trophic State Index	1999
McCoy Run	WVO-88-D-3	Fecal Coliform	2009
		Iron	2009
Point Run	WVO-88-D-5	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Roneys Point Run	WVO-88-D-6	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
Battle Run	WVO-88-D-8	Fecal Coliform	2009
		Iron	2009
McGraw Run	WVO-88-D-9	Fecal Coliform	2009
UNT/Little Wheeling Creek RM 8.97	WVO-88-D-15	Fecal Coliform	2009
Britt Run	WVO-88-E.9	Fecal Coliform	2009
Grandstaff Run	WVO-88-H	Fecal Coliform	2009
Wherry Run	WVO-88-H-2	Fecal Coliform	2009

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Hollidays Run	WVO-88-H.5	Fecal Coliform	2009
Burch Run	WVO-88-I	Fecal Coliform	2009
Burch Run Lake	WVO-88-I-(L1)	Sedimentation/Siltation	1998
		Trophic State Index	1998
Big Run	WVO-88-I-1	Fecal Coliform	2009
UNT/Big Run RM 0.26	WVO-88-I-1-A	Fecal Coliform	2009
Stull Run	WVO-88-K	Fecal Coliform	2009
UNT/Wheeling Creek RM 25.77	WVO-88-M.3	Chloride	2009
		Fecal Coliform	2009
UNT/Wheeling Creek RM 26.23	WVO-88-M.35	Fecal Coliform	2009
UNT/Wheeling Creek RM 26.55	WVO-88-M.4	Fecal Coliform	2009
Enlow Fork	WVO-88-O	Fecal Coliform	2009
Glenns Run	WVO-89	Aluminum (d)	2009
		CNA-Biological	2009
		Iron	2009
		Manganese	2009
		pH	2009
Graeb Hollow	WVO-89-A	Iron	2009
UNT/Glenns Run RM 1.38	WVO-89-B	Iron	2009
Short Creek	WVO-90	Fecal Coliform	2009
Girty Run	WVO-90-A	Fecal Coliform	2009
North Fork/Short Creek	WVO-90-D	Chloride	2009
		Fecal Coliform	2009
UNT/North Fork RM 1.32/Short Creek	WVO-90-D-0.8	CNA-Biological	2009
		Fecal Coliform	2009
Huff Run	WVO-90-D-1	Chloride	2009
		Fecal Coliform	2009
UNT/North Fork RM 2.55/Short Creek	WVO-90-D-1.6	Fecal Coliform	2009
UNT/North Fork RM 2.77/Short Creek	WVO-90-D-1.8	Fecal Coliform	2009

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Weidman Run	WVO-90-D-2	CNA-Biological	2009
		Fecal Coliform	2009
UNT/Ohio River MP 79.4	WVO-91	Fecal Coliform	2009
Pierce Run	WVO-92-D	CNA-Biological	2009
		Fecal Coliform	2009
		Iron	2009
UNT/Pierce Run RM 2.67	WVO-92-D-6	Fecal Coliform	2009
UNT/Buffalo Creek RM 5.18	WVO-92-E.1	Iron	2009
Mingo Run	WVO-92-G	Fecal Coliform	2009
Castleman Run	WVO-92-L	CNA-Biological	2009
		Fecal Coliform	2009
Castleman Run Lake	WVO-92-L-(L1)	Sedimentation/Siltation	1999
		Trophic State Index	1999
Longs Run	WVO-92-L-1	Fecal Coliform	2009
Rices Run	WVO-92-L-4	Fecal Coliform	2009

WEST FORK WATERSHED - HUC# 05020002

West Fork River	WVMW	Iron	2002
Booths Creek	WVMW-2	Iron	2002
UNT/Booths Creek RM 1.39	WVMW-2-0.1A	Iron	2002
		pH	2002
UNT/Booths Creek RM 3.58	WVMW-2-0.5A	Iron	2002
		pH	2002
Hog Lick Run	WVMW-2-A	Iron	2002
Sweep Run	WVMW-2-C	Iron	2002
Horners Run	WVMW-2-D	Iron	2002
		pH	2002
Purdys Run	WVMW-2-D-1	Iron	2002
		pH	2002

Supplemental Table B - Waters with TMDLs Developed

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Booths Creek RM 8.22	WVMW-2-D.5	Iron	2002
Coons Run	WVMW-3	Iron	2002
		pH	2002
Bingamon Creek	WVMW-7	Iron	2002
Elklick Run	WVMW-7-C	Iron	2002
Cunningham Run	WVMW-7-D	Iron	2002
UNT/West Fork River RM 11.44	WVMW-7.1	Iron	2002
		pH	2002
Laurel Run	WVMW-8	Iron	2002
UNT/West Fork River RM 13.10 (at Viropa)	WVMW-8.5	Iron	2002
		pH	2002
Mudlick Run	WVMW-9	Iron	2002
		pH	2002
UNT/West Fork River RM 13.91	WVMW-9.5	Iron	2002
		pH	2002
Browns Run	WVMW-10	Iron	2002
Shinns Run	WVMW-11	Iron	2002
		pH	2002
Robinson Run	WVMW-12	Iron	2002
Pigotts Run	WVMW-12-A	Iron	2002
UNT/Robinson Run RM 1.08	WVMW-12-B	Iron	2002
Tenmile Creek	WVMW-13	Iron	2002
Jack Run	WVMW-13-0.5A	Iron	2002
Jones Creek	WVMW-13-A	Iron	2002
		Manganese	2002
Little Tenmile Creek	WVMW-13-B	Iron	2002
Peters Run	WVMW-13-B-1	Iron	2002
UNT/Little Tenmile Creek RM1.91	WVMW-13-B-1.5	Iron	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Bennett Run	WVMW-13-B-2	Iron	2002
		pH	2002
Laurel Run/Little Tenmile Creek	WVMW-13-B-4	Iron	2002
Big Elk Creek	WVMW-13-B-6	Iron	2002
Mudlick Run	WVMW-13-B-9	Iron	2002
		pH	2002
Isaac Creek	WVMW-13-C	Iron	2002
Little Isaac Creek	WVMW-13-C-1	Iron	2002
Gregory Run	WVMW-13-D	Iron	2002
Katy Lick Run	WVMW-13-E	Iron	2002
UNT/Tenmile Creek RM 10.82	WVMW-13-E.7	Iron	2002
Rockcamp Run	WVMW-13-F	Iron	2002
Little Rockcamp Run	WVMW-13-F-1	Iron	2002
Cherrycamp Run	WVMW-13-I-2	Iron	2002
Patterson Fork	WVMW-13-I-3	Iron	2002
Coburn Fork	WVMW-13-N	Iron	2002
		pH	2002
Shaw Run	WVMW-13-N-1	Iron	2002
		pH	2002
UNT/West Fork River RM 20.42	WVMW-14.2	Iron	2002
		pH	2002
Simpson Creek	WVMW-15	Iron	2002
UNT/Simpson Creek RM 1.23	WVMW-15-0.5A	Iron	2002
		pH	2002
Jack Run	WVMW-15-A	Iron	2002
		pH	2002
Smith Run	WVMW-15-B	Iron	2002
		pH	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Jerry Run	WVMW-15-H	Iron	2002
		pH	2002
Berry Run	WVMW-15-I	Iron	2002
		pH	2002
Right Fork/Simpson Creek	WVMW-15-J	Iron	2002
		pH	2002
UNT/Right Fork RM 0.33/Simpson Creek	WVMW-15-J-0.3	Iron	2002
		pH	2002
UNT/Simpson Creek RM 21.92	WVMW-15-J.5	Iron	2002
		pH	2002
Buck Run	WVMW-15-J-1	Iron	2002
		pH	2002
Sand Lick Run	WVMW-15-J-2	Iron	2002
		pH	2002
Gabe Fork	WVMW-15-J-3	Iron	2002
		pH	2002
Bartlett Run	WVMW-15-K	Iron	2002
		pH	2002
UNT/Simpson Creek RM 22.72	WVMW-15-K.7	Iron	2002
		pH	2002
West Branch/Simpson Creek	WVMW-15-L	Iron	2002
		pH	2002
UNT/West Branch RM 0.63/Simpson Creek	WVMW-15-L-0.5	Iron	2002
		pH	2002
Stillhouse Run	WVMW-15-L-1	Iron	2002
		pH	2002
UNT/West Branch RM 1.57/Simpson Creek	WVMW-15-L-2	Iron	2002
		pH	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Camp Run	WVMW-15-M	Iron	2002
		pH	2002
UNT/Simpson Creek RM 26.94	WVMW-15-N	Iron	2002
		pH	2002
Lambert Run	WVMW-16	Iron	2002
		pH	2002
Jack Run	WVMW-17	Iron	2002
Fall Run	WVMW-18	Iron	2002
		pH	2002
Crooked Run	WVMW-19	Iron	2002
		pH	2002
Simpson Fork	WVMW-20-B	Iron	2002
Elk Creek	WVMW-21	Iron	2002
Murphy Run	WVMW-21-A	Iron	2002
		pH	2002
Nutter Run	WVMW-21-D	Iron	2002
Turkey Run	WVMW-21-E	Iron	2002
Hooppole Run	WVMW-21-F	Iron	2002
Brushy Fork	WVMW-21-G	Iron	2002
Coplin Run	WVMW-21-G-1	Iron	2002
Gnatty Creek	WVMW-21-M	Iron	2002
Right Branch/Gnatty Creek	WVMW-21-M-5	Iron	2002
Charity Fork	WVMW-21-M-5-A	Iron	2002
Birds Run	WVMW-21-O	Iron	2002
Arnold Run	WVMW-21-P	Iron	2002
Isaacs Run	WVMW-21-Q	Iron	2002
Stewart Run	WVMW-21-S	Iron	2002
Washburncamp Run	WVMW-22-A	Iron	2002
		Manganese	2002

WEST VIRGINIA

Supplemental Table B - Waters with TMDLs Developed

Stream Name	Stream Code	Criteria	TMDL Date
Browns Creek	WVMW-23	Iron	2002
Coburns Creek	WVMW-24	Iron	2002
Sycamore Creek	WVMW-25	Iron	2002
Lost Creek	WVMW-26	Iron	2002
UNT/Lost Creek RM 3.32	WVMW-26-0.5A	Iron	2002
Bonds Run	WVMW-26-A	Iron	2002
Buffalo Creek	WVMW-27	Iron	2002
Hackers Creek	WVMW-31	Iron	2002
		Manganese	2002
		pH	2002
Mare Run	WVMW-36-C.5	Iron	2002
Grass Run	WVMW-38-E	Iron	2002
		Manganese	2002
Stone Lick	WVMW-44	Iron	2002
		Manganese	2002
Fitz Run	WVMW-50-C	Iron	2002
		Manganese	2002
		pH	2002
Ward Run	WVMW-50-D	Iron	2002
		Manganese	2002

Supplemental Table C - Water Quality Improvements

Supplemental Table C - Water Quality Improvements

WEST VIRGINIA

HYDROLOGIC GROUP A

SOUTH BRANCH POTOMAC WATERSHED - HUC# 02070001

South Fork/South Branch Potomac River	WVPSB-21	Fecal coliform	Entire length	2002
North Fork/South Branch Potomac River	WVPSB-28	Fecal coliform	Entire length	2002

HYDROLOGIC GROUP B

ELK WATERSHED - HUC# 05050007

Fall Run	WVKE-98-C-14	pH	Entire length	2008

TYGART VALLEY WATERSHED - HUC# 05020001

Marsh Fork	WVMTB-31-J	pH	Entire length	2008

HYDROLOGIC GROUP C

GAULEY WATERSHED - HUC# 05070102

CRANBERRY RIVER SUBWATERSHED				
Dogway Fork	WVKGC-19	pH	Mouth to RM 6.8	2006
WILLIAMS RIVER SUBWATERSHED				
Sugar Creek	WVKGW-21	pH	Mouth to RM 2.5	2006

HYDROLOGIC GROUP E

WEST FORK WATERSHED - HUC# 05020002

West Fork River	WVMW	Zinc (d)	Mouth to RM 74.4 (Stonewall Jackson Dam)	2010

Supplemental Table D - Impaired Waters - No TMDL Development Needed

Supplemental Table D - Impaired Waters - No TMDL Development Needed

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (miles)	Reach Description

CATEGORY 4b - Impaired or threatened for one or more designated uses but does not require the development of a TMDL: Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.

HYDROLOGIC GROUP B

NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (miles)	Reach Description
Stony River	WVPNB-17	Ammonia	Point Source Discharge	4.7	RM 7.7 (Mill Run) to RM 12.4 (Fourmile Run)
		CNA-Biological	Point Source Discharge	2.3	RM 12.4 (Fourmile Run) to RM 14.7 (Mount Storm Lake)
		Temperature, water	Point Source Discharge	2.3	RM 12.4 (Fourmile Run) to RM 14.7 (Mount Storm Lake)
Fourmile Run	WVPNB-17-C	Aluminum (d)	Point Source Discharge	1.5	Entire length
		Ammonia	Point Source Discharge	0.7	Mouth to RM 0.7

Supplemental Table D - Impaired Waters - No TMDL Development Needed

CATEGORY 4c - Impaired or threatened for one or more designated uses but does not require the development of a TMDL: Impairment is not caused by a pollutant.

HYDROLOGIC GROUP B

COAL WATERSHED - HUC# 05050009

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (miles)	Reach Description
Spruce Laurel Fork	WVKC-10-T-11	Low Flow Alterations	Coal Mining	7.6	From RM 6.1 to RM 13.7
Sycamore Fork	WVKC-10-T-11-F	Low Flow Alterations	Coal Mining	2.4	From mouth to RM 2.4
UNT/Sycamore Fork RM 1.4	WVKC-10-T-11-F-2	Low Flow Alterations	Coal Mining	0.4	Entire length
UNT/Sycamore Fork RM 1.7	WVKC-10-T-11-F-3	Low Flow Alterations	Coal Mining	0.4	Entire length
UNT/Sycamore Fork RM 2.0	WVKC-10-T-11-F-4	Low Flow Alterations	Coal Mining	0.3	From mouth to RM 0.3
UNT/Sycamore Fork RM 2.3	WVKC-10-T-11-F-5	Low Flow Alterations	Coal Mining	0.1	Entire length
Skin Poplar Branch	WVKC-10-T-11-G	Low Flow Alterations	Coal Mining	2.5	From mouth to RM 2.5
Jigly Branch	WVKC-10-T-11-G-1	Low Flow Alterations	Coal Mining	1.5	Entire length
UNT/Jigly Branch RM 0.8	WVKC-10-T-11-G-1-B	Low Flow Alterations	Coal Mining	0.5	Entire length
UNT/Skin Poplar Branch RM 2.5	WVKC-10-T-11-G-4	Low Flow Alterations	Coal Mining	0.3	From mouth to RM 0.3
Lower Lick Branch	WVKC-10-T-11-I	Low Flow Alterations	Coal Mining	0.7	From mouth to RM 0.7
UNT/James Branch RM 0.5	WVKC-10-U-16-A	Low Flow Alterations	Coal Mining	0.9	From RM 0.5 to RM 1.4
UNT/UNT RM 0.5/James Branch RM 0.5	WVKC-10-U-16-A-1	Low Flow Alterations	Coal Mining	0.6	Entire length
UNT/UNT RM 1.1/James Branch RM 0.5	WVKC-10-U-16-A-2	Low Flow Alterations	Coal Mining	0.6	Entire length
West Fork/Pond Fork	WVKC-10-U-7	Low Flow Alterations	Coal Mining	6.5	From RM 9.7 to RM 16.2
Bandy Branch	WVKC-10-U-7-E	Low Flow Alterations	Coal Mining	2.6	From mouth to RM 2.6
Mudlick Branch	WVKC-10-U-7-E-1	Low Flow Alterations	Coal Mining	1.7	From mouth to RM 1.7
UNT/Mudlick Branch RM 1.0	WVKC-10-U-7-E-1-A	Low Flow Alterations	Coal Mining	0.4	Entire length
Still Hollow	WVKC-10-U-7-E-2	Low Flow Alterations	Coal Mining	0.6	Entire length

Supplemental Table D - Impaired Waters - No TMDL Development Needed

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (miles)	Reach Description
James Creek	WVKC-10-U-7-I	Low Flow Alterations	Coal Mining	0.7	From RM 0.16 to RM 0.84
Ducky Ferrel Hollow	WVKC-10-U-7-I.5	Low Flow Alterations	Coal Mining	1.2	Entire length
UNT/James Creek RM 0.23	WVKC-10-U-7-I-1	Low Flow Alterations	Coal Mining	0.8	From mouth to RM 0.8
Matts Creek	WVKC-10-U-7-J	Low Flow Alterations	Coal Mining	2.0	From mouth to RM 2.0
UNT/ Matts Creek RM 0.2	WVKC-10-U-7-J-1	Low Flow Alterations	Coal Mining	0.2	Entire length
UNT/ Matts Creek RM 0.9	WVKC-10-U-7-J-2	Low Flow Alterations	Coal Mining	0.6	From mouth to RM 0.6
UNT/UNT RM 0.2/ Matts Creek RM 0.9	WVKC-10-U-7-J-2-A	Low Flow Alterations	Coal Mining	0.3	Entire length
UNT/ Matts Creek RM 1.4	WVKC-10-U-7-J-3	Low Flow Alterations	Coal Mining	0.4	Entire length
UNT/West Fork RM 10.6	WVKC-10-U-7-K	Low Flow Alterations	Coal Mining	0.6	Entire length
UNT/West Fork RM 11.6	WVKC-10-U-7-L	Low Flow Alterations	Coal Mining	0.5	Entire length
UNT/West Fork RM 11.8	WVKC-10-U-7-M	Low Flow Alterations	Coal Mining	0.5	Entire length
UNT/West Fork RM 11.9	WVKC-10-U-7-N	Low Flow Alterations	Coal Mining	0.5	Entire length
UNT/West Fork RM 12.1	WVKC-10-U-7-O	Low Flow Alterations	Coal Mining	0.4	From mouth to RM 0.4
UNT/West Fork RM 13.0	WVKC-10-U-7-P	Low Flow Alterations	Coal Mining	0.8	Entire length
UNT/West Fork RM 14.3	WVKC-10-U-7-Q	Low Flow Alterations	Coal Mining	1.1	Entire length
UNT/West Fork RM 14.5	WVKC-10-U-7-R	Low Flow Alterations	Coal Mining	1.0	Entire length
UNT/West Fork RM 15.5	WVKC-10-U-7-S	Low Flow Alterations	Coal Mining	0.9	From mouth to RM 0.9
UNT/UNT RM 0.3/West Fork RM 15.5	WVKC-10-U-7-S-1	Low Flow Alterations	Coal Mining	0.3	From mouth to RM 0.3
UNT/West Fork RM 15.7	WVKC-10-U-7-T	Low Flow Alterations	Coal Mining	0.5	Entire length
UNT/West Fork RM 16.0	WVKC-10-U-7-U	Low Flow Alterations	Coal Mining	0.4	Entire length

Supplemental Table E - Total Aluminum TMDLs

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP A			
CHEAT WATERSHED - HUC# 05020004			
Cheat River	WVMC	Aluminum (tot)	2001
UNT/Cheat River RM 4.0	WVMC-0.5	Aluminum (tot)	2001
UNT/Cheat River RM 7.7	WVMC-2.3	Aluminum (tot)	2001
UNT/Cheat River RM 8.5	WVMC-2.4	Aluminum (tot)	2001
Crammeys Run	WVMC-3	Aluminum (tot)	2001
Bull Run	WVMC-11	Aluminum (tot)	2001
UNT/Bull Run RM 1.6	WVMC-11-0.1A	Aluminum (tot)	2001
Middle Run	WVMC-11-A	Aluminum (tot)	2001
Mountain Run	WVMC-11-B	Aluminum (tot)	2001
Lick Run	WVMC-11-B-1	Aluminum (tot)	2001
Right Fork/Bull Run	WVMC-11-E	Aluminum (tot)	2001
Big Sandy Creek	WVMC-12	Aluminum (tot)	2001
UNT/Big Sandy Creek RM 2.9	WVMC-12-0.2A	Aluminum (tot)	2001
Sovern Run	WVMC-12-0.5A	Aluminum (tot)	2001
Little Sandy Creek	WVMC-12-B	Aluminum (tot)	2001
Webster Run	WVMC-12-B-0.5	Aluminum (tot)	2001
Beaver Creek	WVMC-12-B-1	Aluminum (tot)	2001
Glade Run	WVMC-12-B-1-A	Aluminum (tot)	2001
UNT/Beaver Creek RM 1.68	WVMC-12-B-1-C	Aluminum (tot)	2001
Hog Run	WVMC-12-B-3	Aluminum (tot)	2001
Cherry Run	WVMC-12-B-5	Aluminum (tot)	2001
Hazel Run	WVMC-12-C	Aluminum (tot)	2001
Conner Run	WVMC-13.5	Aluminum (tot)	2001

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Greens Run	WVMC-16	Aluminum (tot)	2001
South Fork/Greens Run	WVMC-16-A	Aluminum (tot)	2001
UNT/South Fork RM 0.6/Greens Run	WVMC-16-A-1	Aluminum (tot)	2001
Muddy Creek	WVMC-17	Aluminum (tot)	2001
Martin Creek	WVMC-17-A	Aluminum (tot)	2001
Fickey Run	WVMC-17-A-0.5	Aluminum (tot)	2001
Glade Run	WVMC-17-A-1	Aluminum (tot)	2001
UNT/Glade Run RM 1.06	WVMC-17-A-1-A	Aluminum (tot)	2001
UNT/Glade Run RM 1.36	WVMC-17-A-1-B	Aluminum (tot)	2001
Roaring Creek	WVMC-18	Aluminum (tot)	2001
Morgan Run	WVMC-23	Aluminum (tot)	2001
UNT/Morgan Run RM 1.1	WVMC-23-0.2A	Aluminum (tot)	2001
Church Creek	WVMC-23-A	Aluminum (tot)	2001
UNT/Church Creek RM 1.2	WVMC-23-A-1	Aluminum (tot)	2001
Heather Run	WVMC-24	Aluminum (tot)	2001
UNT/Heather Run RM 1.5	WVMC-24-A	Aluminum (tot)	2001
Lick Run	WVMC-25	Aluminum (tot)	2001
Joes Run	WVMC-26	Aluminum (tot)	2001
Pringle Run	WVMC-27	Aluminum (tot)	2001
Left Fork/Pringle Run	WVMC-27-A	Aluminum (tot)	2001
UNT/Pringle Run RM 3.60 (Right Fork/Pringle Run)	WVMC-27-E	Aluminum (tot)	2001
Blackwater River	WVMC-60-D	Aluminum (tot)	2001
Tub Run	WVMC-60-D-2	Aluminum (tot)	2001
Finley Run	WVMC-60-D-2.7	Aluminum (tot)	2001
North Fork/Blackwater River	WVMC-60-D-3	Aluminum (tot)	2001
Long Run	WVMC-60-D-3-A	Aluminum (tot)	2001
Middle Run	WVMC-60-D-3-B	Aluminum (tot)	2001

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Snyder Run	WVMC-60-D-3-C	Aluminum (tot)	2001
Beaver Creek	WVMC-60-D-5	Aluminum (tot)	2001
Hawkins Run	WVMC-60-D-5-C	Aluminum (tot)	2001
UPPER KANAWHA WATERSHED - HUC# 05050006			
Paint Creek	WVK-65	Aluminum (tot)	2001
Jones Branch	WVK-65-C	Aluminum (tot)	2001
Tenmile Fork	WVK-65-M	Aluminum (tot)	2001
Long Branch	WVK-65-M-1	Aluminum (tot)	2001
Hickory Camp Branch	WVK-65-P	Aluminum (tot)	2001
UNT/Paint Creek RM 17.2	WVK-65-Q.3	Aluminum (tot)	2001
UNT/Paint Creek RM 17.6	WVK-65-Q.5	Aluminum (tot)	2001
Fifteenmile Creek	WVK-65-R	Aluminum (tot)	2001
Skitter Creek	WVK-65-T	Aluminum (tot)	2001
Lykins Creek	WVK-65-W	Aluminum (tot)	2001
Long Branch	WVK-65-Y-2	Aluminum (tot)	2001
Packs Branch	WVK-65-DD	Aluminum (tot)	2001
Big Fork	WVK-65-DD-2	Aluminum (tot)	2001

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP B			
ELK WATERSHED - HUC# 05050007			
Elk River	WVKE	Aluminum (tot)	2001
Morris Creek	WVKE-26	Aluminum (tot)	2001
Left Fork/Morris Creek	WVKE-26-A	Aluminum (tot)	2001
Buffalo Creek	WVKE-50	Aluminum (tot)	2001
Pheasant Run	WVKE-50-T	Aluminum (tot)	2001
LOWER KANAWHA WATERSHED - HUC# 05050008			
Ridenour Lake	WVK-30-A-(L1)	Aluminum (tot)	1999
NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002			
Stony River	WVPNB-17	Aluminum (tot)	2001
Fourmile Run	WVPNB-17-C	Aluminum (tot)	2001
Laurel Run	WVPNB-17-D	Aluminum (tot)	2001
Helmick Run	WVPNB-17-E	Aluminum (tot)	2001
TYGART VALLEY WATERSHED - HUC# 05020001			
Tygart Valley River	WVMT	Aluminum (tot)	2001
Goose Creek	WVMT-4	Aluminum (tot)	2001
Lost Run	WVMT-5	Aluminum (tot)	2001
Berkely Run	WVMT-11	Aluminum (tot)	2001
Shelby Run	WVMT-11-A	Aluminum (tot)	2001
Long Run	WVMT-11-B	Aluminum (tot)	2001
Berry Run	WVMT-11-B-1	Aluminum (tot)	2001
Three Fork Creek	WVMT-12	Aluminum (tot)	2001

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Raccoon Creek	WVMT-12-C	Aluminum (tot)	2001
Little Racoon Run	WVMT-12-C-2	Aluminum (tot)	2001
Brains Creek	WVMT-12-G-2	Aluminum (tot)	2001
Birds Creek	WVMT-12-H	Aluminum (tot)	2001
Squires Creek	WVMT-12-H-1	Aluminum (tot)	2001
Sandy Creek	WVMT-18	Aluminum (tot)	2001
Glade Run	WVMT-18-C	Aluminum (tot)	2001
Little Sandy Creek	WVMT-18-E	Aluminum (tot)	2001
Maple Run	WVMT-18-E-1	Aluminum (tot)	2001
Left Fork/Little Sandy Creek	WVMT-18-E-3	Aluminum (tot)	2001
Left Fork/Sandy Creek	WVMT-18-G	Aluminum (tot)	2001
Frost Run	WVMT-24-A	Aluminum (tot)	2001
Foxgrape Run	WVMT-26-B	Aluminum (tot)	2001
Little Hackers Creek	WVMT-26-C	Aluminum (tot)	2001
Ford Run	WVMT-27	Aluminum (tot)	2001
Anglins Run	WVMT-29	Aluminum (tot)	2001
Pecks Run	WVMTB-5	Aluminum (tot)	2001
UNT/Pecks Run RM 3.62	WVMTB-5-0.8A	Aluminum (tot)	2001
Mud Run	WVMTB-5-C	Aluminum (tot)	2001
Turkey Run	WVMTB-10	Aluminum (tot)	2001
Sugar Run	WVMTB-10-A	Aluminum (tot)	2001
Fink Run	WVMTB-11	Aluminum (tot)	2001
Bridge Run	WVMTB-11-B.7	Aluminum (tot)	2001
Tenmile Creek	WVMTB-25	Aluminum (tot)	1998
Swamp Run	WVMTB-29	Aluminum (tot)	2001
Middle Fork River	WVMTM	Aluminum (tot)	2001
Devil Run	WVMTM-4	Aluminum (tot)	2001
Hell Run	WVMTM-6	Aluminum (tot)	2001

WEST VIRGINIA

Supplemental Table E - Total Aluminum TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Whiteoak Run	WVMTM-8	Aluminum (tot)	2001
Cassity Fork	WVMTM-16	Aluminum (tot)	2001
Panther Run	WVMTM-16-A	Aluminum (tot)	2001
Island Run	WVMT-36	Aluminum (tot)	2001
Beaver Creek	WVMT-37	Aluminum (tot)	2001
Laurel Run	WVMT-39	Aluminum (tot)	2001
UNT/Tygart Valley River RM 75.2 (Harding)	WVMT-40.5	Aluminum (tot)	2001
Grassy Run	WVMT-41	Aluminum (tot)	2001
Roaring Creek	WVMT-42	Aluminum (tot)	2001

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP C			
MIDDLE OHIO SOUTH WATERSHED - HUC# 05030202			
Turkey Run Lake	WVO-37-(L1)	Aluminum (tot)	1999
TUG FORK WATERSHED - HUC# 05070201			
Tug Fork River	WVBST	Aluminum (tot)	2002
PowderMill Branch	WVBST-3	Aluminum (tot)	2002
Pigeon Creek	WVBST-24	Aluminum (tot)	2002
Millstone Branch	WVBST-24-O	Aluminum (tot)	2002
Sugartree Creek	WVBST-32	Aluminum (tot)	2002
Williamson Creek	WVBST-33	Aluminum (tot)	2002
Sprouse Creek	WVBST-38	Aluminum (tot)	2002
Mate Creek	WVBST-40	Aluminum (tot)	2002
Rutherford Branch	WVBST-40-B	Aluminum (tot)	2002
Mitchell Branch	WVBST-40-C	Aluminum (tot)	2002
Chafin Branch	WVBST-40-D	Aluminum (tot)	2002
Thacker Creek	WVBST-42	Aluminum (tot)	2002
Scissorsville Branch	WVBST-42-A	Aluminum (tot)	2002
Mauchlinville Branch	WVBST-42-B	Aluminum (tot)	2002
Grapevine Creek	WVBST-43	Aluminum (tot)	2002
Lick Fork	WVBST-43-A	Aluminum (tot)	2002
Panther Creek	WVBST-60	Aluminum (tot)	2002
Cub Branch	WVBST-60-D	Aluminum (tot)	2002
Grapevine Branch	WVBST-70-F	Aluminum (tot)	2002
Beartown Branch	WVBST-70-I	Aluminum (tot)	2002
Atwell Branch	WVBST-70-O	Aluminum (tot)	2002
Clear Fork	WVBST-76	Aluminum (tot)	2002

WEST VIRGINIA

Supplemental Table E - Total Aluminum TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Shabbyroom Branch	WVBST-78-B	Aluminum (tot)	2002
HoneyCamp Branch	WVBST-78-D	Aluminum (tot)	2002
Coontree Branch	WVBST-78-E	Aluminum (tot)	2002
Stonecoal Branch	WVBST-78-F	Aluminum (tot)	2002
Badway Branch	WVBST-78-G	Aluminum (tot)	2002
Newson Branch	WVBST-78-H	Aluminum (tot)	2002
Moorecamp Branch	WVBST-78-I	Aluminum (tot)	2002
Left Fork/Davy Branch	WVBST-85-A	Aluminum (tot)	2002
Shannon Branch	WVBST-94	Aluminum (tot)	2002
Upper Shannon Branch	WVBST-95	Aluminum (tot)	2002
Puncheoncamp Branch	WVBST-98-A	Aluminum (tot)	2002
Little Indian Creek	WVBST-100	Aluminum (tot)	2002
Jed Branch	WVBST-102	Aluminum (tot)	2002
Rock Narrows Branch	WVBST-103	Aluminum (tot)	2002
Harris Branch	WVBST-104	Aluminum (tot)	2002
Mitchell Branch	WVBST-105	Aluminum (tot)	2002
Sugarcamp Branch	WVBST-106	Aluminum (tot)	2002
Grapevine Branch	WVBST-107	Aluminum (tot)	2002
Sandlick Creek	WVBST-109	Aluminum (tot)	2002
Right Fork/Sandlick Creek	WVBST-109-A	Aluminum (tot)	2002
Left Fork/Sandlick Creek	WVBST-109-B	Aluminum (tot)	2002
Adkin Branch	WVBST-110	Aluminum (tot)	2002
Belcher Branch	WVBST-111	Aluminum (tot)	2002
Turnhole Branch	WVBST-112	Aluminum (tot)	2002
Harmon Branch	WVBST-113	Aluminum (tot)	2002
South Fork/Tug Fork River	WVBST-115	Aluminum (tot)	2002
Tea Branch	WVBST-115-A	Aluminum (tot)	2002
McClure Branch	WVBST-115-B	Aluminum (tot)	2002

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Jump Branch	WVBST-115-D	Aluminum (tot)	2002
Spice Creek	WVBST-115-E	Aluminum (tot)	2002
Laurel Branch	WVBST-115-F	Aluminum (tot)	2002
Road Fork	WVBST-115-G	Aluminum (tot)	2002
Belcher Branch	WVBST-116	Aluminum (tot)	2002
Loop Branch	WVBST-117	Aluminum (tot)	2002
Mill Branch	WVBST-118	Aluminum (tot)	2002
Dry Branch	WVBST-119	Aluminum (tot)	2002
Little Creek	WVBST-120	Aluminum (tot)	2002
Indian Grave Branch	WVBST-120-A	Aluminum (tot)	2002
Puncheoncamp Branch	WVBST-120-B	Aluminum (tot)	2002
Millseat Branch	WVBST-121	Aluminum (tot)	2002
Ballard Harmon Branch	WVBST-122	Aluminum (tot)	2002
Sams Branch	WVBST-123	Aluminum (tot)	2002

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP D			
LITTLE KANAWHA WATERSHED - HUC# 05030203			
Little Kanawha River	WVLK	Aluminum (tot)	2000
Reedy Creek	WVLK-25	Aluminum (tot)	2000
Spring Creek	WVLK-31	Aluminum (tot)	2000
Sand Fork	WVLK-86	Aluminum (tot)	2000
Oil Creek	WVLK-94	Aluminum (tot)	2000
Saltlick Creek	WVLK-95	Aluminum (tot)	2000
LOWER NEW WATERSHED - HUC# 05050004			
Dunloup Creek	WVKN-22	Aluminum (tot)	2002
Meadow Fork	WVKN-22-B	Aluminum (tot)	2002
MONONGAHELA WATERSHED - HUC# 05020003			
Monongahela River	WVM	Aluminum (tot)	2002
Camp Run	WVM-2.1	Aluminum (tot)	2002
UNT/Monongahela River RM 92.0	WVM-2.6	Aluminum (tot)	2002
Laurel Run	WVM-2.7	Aluminum (tot)	2002
West Run	WVM-3	Aluminum (tot)	2002
Robinson Run	WVM-4	Aluminum (tot)	2004
Crafts Run	WVM-4-A	Aluminum (tot)	2002
UNT/Robinson Run RM 1.09	WVM-4-B	Aluminum (tot)	2002
Scotts Run	WVM-6	Aluminum (tot)	2002
Dents Run	WVM-7	Aluminum (tot)	2002
UNT/Dents Run RM 3.57	WVM-7-C	Aluminum (tot)	2002
Deckers Creek	WVM-8	Aluminum (tot)	2002
Hartman Run	WVM-8-0.5A	Aluminum (tot)	2002

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Deep Hollow	WVM-8-A.7	Aluminum (tot)	2002
Glady Run	WVM-8-D	Aluminum (tot)	2002
Slabcamp Run	WVM-8-F	Aluminum (tot)	2002
Dillan Creek	WVM-8-G	Aluminum (tot)	2002
Laurel Run	WVM-8-H	Aluminum (tot)	2002
Kanes Creek	WVM-8-I	Aluminum (tot)	2002
Booths Creek	WVM-10	Aluminum (tot)	2002
Owl Creek	WVM-10-D	Aluminum (tot)	2002
Mays Run	WVM-10-E	Aluminum (tot)	2002
UNT/Booths Creek RM 6.24	WVM-10-F	Aluminum (tot)	2002
Brand Run	WVM-11	Aluminum (tot)	2002
Flaggy Meadow Run	WVM-14	Aluminum (tot)	2002
Birchfield Run	WVM-15	Aluminum (tot)	2002
Indian Creek	WVM-17	Aluminum (tot)	2002
Parker Run	WVM-20	Aluminum (tot)	2002
UNT/Monongahela River RM 121.8	WVM-20.2	Aluminum (tot)	2002
Robinson Run	WVM-22-C	Aluminum (tot)	2002
Sugar Run	WVM-22-K	Aluminum (tot)	2002
Buffalo Creek	WVM-23	Aluminum (tot)	2002
Mod Run	WVM-23-K	Aluminum (tot)	2002
Fleming Fork	WVM-23-N-1	Aluminum (tot)	2002
Whetstone Run	WVM-23-Q	Aluminum (tot)	2002
Joes Run	WVM-23-R	Aluminum (tot)	2002
UNT/Monongahela River RM 128.55	WVM-25.9	Aluminum (tot)	2002

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP E			
LOWER OHIO WATERSHED - HUC# 05090101			
Fourpole Creek	WVO-3	Aluminum (tot)	2002
WEST FORK WATERSHED - HUC# 05020002			
West Fork River	WVMW	Aluminum (tot)	2002
Booths Creek	WVMW-2	Aluminum (tot)	2002
UNT/Booths Creek RM 1.4	WVMW-2-0.1A	Aluminum (tot)	2002
UNT/Booths Creek RM 3.5	WVMW-2-0.5A	Aluminum (tot)	2002
Hog Lick Run	WVMW-2-A	Aluminum (tot)	2002
Sweep Run	WVMW-2-C	Aluminum (tot)	2002
Horners Run	WVMW-2-D	Aluminum (tot)	2002
Purdys Run	WVMW-2-D-1	Aluminum (tot)	2002
UNT/Booths Creek RM 8.3	WVMW-2-D.5	Aluminum (tot)	2002
Coons Run	WVMW-3	Aluminum (tot)	2002
Bingamon Creek	WVMW-7	Aluminum (tot)	2002
Elklick Run	WVMW-7-C	Aluminum (tot)	2002
Cunningham Run	WVMW-7-D	Aluminum (tot)	2002
UNT/West Fork River RM 11.44	WVMW-7.1	Aluminum (tot)	2002
Laurel Run	WVMW-8	Aluminum (tot)	2002
UNT/West Fork RM 13.1 (at Viropa)	WVMW-8.5	Aluminum (tot)	2002
Mudlick Run	WVMW-9	Aluminum (tot)	2002
UNT/West Fork RM 13.9	WVMW-9.5	Aluminum (tot)	2002
Browns Run	WVMW-10	Aluminum (tot)	2002
Shinns Run	WVMW-11	Aluminum (tot)	2002
Robinson Run	WVMW-12	Aluminum (tot)	2002
Pigotts Run	WVMW-12-A	Aluminum (tot)	2002

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
UNT/Robinson Run RM 1.08	WVMW-12-B	Aluminum (tot)	2002
Tenmile Creek	WVMW-13	Aluminum (tot)	2002
Jack Run	WVMW-13-0.5A	Aluminum (tot)	2002
Jones Creek	WVMW-13-A	Aluminum (tot)	2002
Little Tenmile Creek	WVMW-13-B	Aluminum (tot)	2002
Peters Run	WVMW-13-B-1	Aluminum (tot)	2002
UNT/Little Tenmile Creek RM 2.0	WVMW-13-B-1.5	Aluminum (tot)	2002
Bennett Run	WVMW-13-B-2	Aluminum (tot)	2002
Laurel Run	WVMW-13-B-4	Aluminum (tot)	2002
Big Elk Creek	WVMW-13-B-6	Aluminum (tot)	2002
Mudlick Run	WVMW-13-B-9	Aluminum (tot)	2002
Isaacs Creek	WVMW-13-C	Aluminum (tot)	2002
Little Isaacs Creek	WVMW-13-C-1	Aluminum (tot)	2002
Gregory Run	WVMW-13-D	Aluminum (tot)	2002
Katys Lick Creek	WVMW-13-E	Aluminum (tot)	2002
UNT/Tenmile Creek RM 10.82	WVMW-13-E.7	Aluminum (tot)	2002
Rockcamp Run	WVMW-13-F	Aluminum (tot)	2002
Little Rockcamp Run	WVMW-13-F-1	Aluminum (tot)	2002
Cherrycamp Run	WVMW-13-I-2	Aluminum (tot)	2002
Patterson Fork	WVMW-13-I-3	Aluminum (tot)	2002
Coburn Fork	WVMW-13-N	Aluminum (tot)	2002
Shaw Run	WVMW-13-N-1	Aluminum (tot)	2002
UNT/West Fork River RM 20.42	WVMW-14.2	Aluminum (tot)	2002
Simpson Creek	WVMW-15	Aluminum (tot)	2002
UNT/Simpson Creek RM 1.23	WVMW-15-0.5A	Aluminum (tot)	2002
Jack Run	WVMW-15-A	Aluminum (tot)	2002
Smith Run	WVMW-15-B	Aluminum (tot)	2002
Jerry Run	WVMW-15-H	Aluminum (tot)	2002

WEST VIRGINIA

Supplemental Table E - Total Aluminum TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Berry Run	WVMW-15-I	Aluminum (tot)	2002
Right Fork/Simpson Creek	WVMW-15-J	Aluminum (tot)	2002
UNT/Right Fork RM 1.97/Simpson Creek	WVMW-15-J-0.3	Aluminum (tot)	2002
Buck Run	WVMW-15-J-1	Aluminum (tot)	2002
Sand Lick Run	WVMW-15-J-2	Aluminum (tot)	2002
Gabe Fork	WVMW-15-J-3	Aluminum (tot)	2002
UNT/Simpson Creek RM 21.92	WVMW-15-J.5	Aluminum (tot)	2002
Bartlett Run	WVMW-15-K	Aluminum (tot)	2002
UNT/Simpson Creek RM 23.1	WVMW-15-K.7	Aluminum (tot)	2002
West Branch/Simpson Creek	WVMW-15-L	Aluminum (tot)	2002
UNT/West Branch RM 0.6/Simpson Creek	WVMW-15-L-0.5	Aluminum (tot)	2002
Stillhouse Run	WVMW-15-L-1	Aluminum (tot)	2002
UNT/West Branch RM 1.6/Simpson Creek	WVMW-15-L-2	Aluminum (tot)	2002
Camp Run	WVMW-15-M	Aluminum (tot)	2002
UNT/Simpson Creek RM 26.94	WVMW-15-N	Aluminum (tot)	2002
Lambert Run	WVMW-16	Aluminum (tot)	2002
Jack Run	WVMW-17	Aluminum (tot)	2002
Fall Run	WVMW-18	Aluminum (tot)	2002
Crooked Run	WVMW-19	Aluminum (tot)	2002
Simpson Fork	WVMW-20-B	Aluminum (tot)	2002
Elk Creek	WVMW-21	Aluminum (tot)	2002
Murphy Run	WVMW-21-A	Aluminum (tot)	2002
Nutter Run	WVMW-21-D	Aluminum (tot)	2002
Turkey Run	WVMW-21-E	Aluminum (tot)	2002
Hooppole Run	WVMW-21-F	Aluminum (tot)	2002
Brushy Fork	WVMW-21-G	Aluminum (tot)	2002
Coplin Run	WVMW-21-G-1	Aluminum (tot)	2002
Gnatty Creek	WVMW-21-M	Aluminum (tot)	2002

Supplemental Table E - Total Aluminum TMDLs

WEST VIRGINIA

Stream Name	Stream Code	Criteria	TMDL Date
Right Branch/Gnatty Creek	WVMW-21-M-5	Aluminum (tot)	2002
Charity Fork	WVMW-21-M-5-A	Aluminum (tot)	2002
Birds Run	WVMW-21-O	Aluminum (tot)	2002
Arnold Run	WVMW-21-P	Aluminum (tot)	2002
Isaacs Run	WVMW-21-Q	Aluminum (tot)	2002
Stewart Run	WVMW-21-S	Aluminum (tot)	2002
Washburncamp Run	WVMW-22-A	Aluminum (tot)	2002
Browns Creek	WVMW-23	Aluminum (tot)	2002
Coburns Creek	WVMW-24	Aluminum (tot)	2002
Sycamore Creek	WVMW-25	Aluminum (tot)	2002
Lost Creek	WVMW-26	Aluminum (tot)	2002
UNT/Lost Creek RM 3.32	WVMW-26-0.5A	Aluminum (tot)	2002
Bonds Run	WVMW-26-A	Aluminum (tot)	2002
Buffalo Creek	WVMW-27	Aluminum (tot)	2002
Hackers Creek	WVMW-31	Aluminum (tot)	2002
Mare Run	WVMW-36-C.5	Aluminum (tot)	2002
Grass Run	WVMW-38-E	Aluminum (tot)	2002
Stone Lick	WVMW-44	Aluminum (tot)	2002
Fitz Run	WVMW-50-C	Aluminum (tot)	2002
Ward Run	WVMW-50-D	Aluminum (tot)	2002

Supplemental Table E - Manganese TMDLs

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP A			
CHEAT WATERSHED - HUC# 05020004			
UNT/Cheat River RM 4.07	WVMC-0.5	Manganese	2001
UNT/Cheat River RM 7.70	WVMC-2.3	Manganese	2001
UNT/Cheat River RM 8.39	WVMC-2.4	Manganese	2001
Crammeys Run	WVMC-3	Manganese	2001
Bull Run	WVMC-11	Manganese	2001
Middle Run	WVMC-11-A	Manganese	2001
Mountain Run	WVMC-11-B	Manganese	2001
Lick Run	WVMC-11-B-1	Manganese	2001
UNT/Bull Run RM 3.73	WVMC-11-C	Manganese	2001
Right Fork Bull Run	WVMC-11-E	Manganese	2001
Big Sandy Creek	WVMC-12	Manganese	2001
UNT/Big Sandy Creek RM 2.91	WVMC-12-0.2A	Manganese	2001
Sovern Run	WVMC-12-0.5A	Manganese	2001
Little Sandy Creek	WVMC-12-B	Manganese	2001
Webster Run	WVMC-12-B-0.5	Manganese	2001
Beaver Creek	WVMC-12-B-1	Manganese	2001
Glade Run	WVMC-12-B-1-A	Manganese	2001
UNT/Beaver Creek RM 1.68	WVMC-12-B-1-C	Manganese	2001
Hog Run	WVMC-12-B-3	Manganese	2001
Cherry Run	WVMC-12-B-5	Manganese	2001
Hazel Run	WVMC-12-C	Manganese	2001
Conner Run	WVMC-13.5	Manganese	2001
Greens Run	WVMC-16	Manganese	2001
South Fork/Greens Run	WVMC-16-A	Manganese	2001

WEST VIRGINIA

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
UNT/South Fork RM 0.63/Greens Run	WVMC-16-A-1	Manganese	2001
Muddy Creek	WVMC-17	Manganese	2001
Martin Creek	WVMC-17-A	Manganese	2001
Fickey Run	WVMC-17-A-0.5	Manganese	2001
Glade Run	WVMC-17-A-1	Manganese	2001
UNT/Glade Run RM 1.06	WVMC-17-A-1-A	Manganese	2001
UNT/Glade Run RM 1.36	WVMC-17-A-1-B	Manganese	2001
Church Creek	WVMC-23-A	Manganese	2001
UNT/Church Creek RM 1.26	WVMC-23-A-1	Manganese	2001
UNT/UNT RM 0.12/Church Creek RM 1.26	WVMC-23-A-1-A	Manganese	2001
Roaring Creek	WVMC-18	Manganese	2001
UNT/Pringle Run RM 3.60	WVMC-27-E	Manganese	2001
Tub Run	WVMC-60-D-2	Manganese	2001
Finley Run	WVMC-60-D-2.7	Manganese	2001
North Fork/Blackwater River	WVMC-60-D-3	Manganese	2001
Long Run	WVMC-60-D-3-A	Manganese	2001
Middle Run	WVMC-60-D-3-B	Manganese	2001
Snyder Run	WVMC-60-D-3-C	Manganese	2001
Beaver Creek	WVMC-60-D-5	Manganese	2001
Hawkins Run	WVMC-60-D-5-C	Manganese	2001

UPPER KANAWHA WATERSHED - HUC# 05050006

Rattlesnake Hollow	WVK-49-I	Manganese	2005
UNT/Left Fork RM 1.8/Lens Creek	WVK-53-A-0.4	Manganese	2005
Witcher Creek	WVK-57	Manganese	2005
Wolfpen Hollow	WVK-58-B.1	Manganese	2005
New West Hollow	WVK-58-B.8-1	Manganese	2005

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Carroll Branch	WVK-59	Manganese	2005
Slaughter Creek	WVK-60	Manganese	2005
Little Creek	WVK-60-A	Manganese	2005
UNT/Little Creek RM 0.39	WVK-60-A-1	Manganese	2005
Bradley Fork	WVK-60-B	Manganese	2005
UNT/Slaughter Creek RM 3.14	WVK-60-B.1	Manganese	2005
Cabin Creek	WVK-61	Manganese	2005
Laurel Fork/Coal Fork	WVK-61-H-1	Manganese	2005
UNT/Coal Fork RM 4.6	WVK-61-H-3	Manganese	2005
UNT/Bear Hollow RM 0.28	WVK-61-I-1	Manganese	2005
Cane Fork	WVK-61-J	Manganese	2005
Fifteenmile Fork	WVK-61-O	Manganese	2005
Abbott Creek	WVK-61-O-1	Manganese	2005
Hicks Hollow	WVK-61.5	Manganese	2005
Watson Branch	WVK-62	Manganese	2005
Jones Branch	WVK-65-C	Manganese	2001
Tenmile Fork	WVK-65-M	Manganese	2001
Long Branch	WVK-65-M-1	Manganese	2001
Hickory Camp Branch	WVK-65-P	Manganese	2001
UNT/Paint Creek RM 16.71	WVK-65-Q.3	Manganese	2001
UMT/Paint Creek RM 17.10	WVK-65-Q.5	Manganese	2001
Fifteenmile Creek	WVK-65-R	Manganese	2001
Skitter Creek	WVK-65-T	Manganese	2001
Lykins Creek	WVK-65-W	Manganese	2001
Long Branch	WVK-65-Y-2	Manganese	2001
Packs Branch	WVK-65-DD	Manganese	2001
Big Fork	WVK-65-DD-2	Manganese	2001

WEST VIRGINIA

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Schuyler Fork	WVK-70-A	Manganese	2005
Jenkins Fork	WVK-73-D	Manganese	2005
Craig Hollow	WVK-73-D-1	Manganese	2005
Laurel Branch/Powellton Fork	WVK-73-E-1	Manganese	2005
Right Fork/Armstrong Creek	WVK-73-F	Manganese	2005
Jarrett Branch	WVK-75	Manganese	2005
UNT/Jarrett Branch RM 1.1	WVK-75-A	Manganese	2005

UPPER OHIO NORTH WATERSHED - HUC# 05030101

Stream Name	Stream Code	Criteria	TMDL Date
Alexanders Run	WVO-97-B	Manganese	2005
Deep Gut Run	WVO-101	Manganese	2005
UNT/Deep Gut Run RM 1.96	WVO-101-E	Manganese	2005

WEST VIRGINIA

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP B			
ELK WATERSHED - HUC# 05050007			
Buffalo Creek	WVKE-50	Manganese	2001
Lilly Fork	WVKE-50-B	Manganese	2001
Pheasant Run	WVKE-50-T	Manganese	2001
NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002			
Stony River	WVPNB-17	Manganese	2001
Fourmile Run	WVPNB-17-C	Manganese	2001
Laurel Run	WVPNB-17-D	Manganese	2001
Helmick Run	WVPNB-17-E	Manganese	2001
TYGART VALLEY WATERSHED - HUC# 05020001			
Goose Creek	WVMT-4	Manganese	2001
Lost Run	WVMT-5	Manganese	2001
Berkeley Run	WVMT-11	Manganese	2001
Shelby Run	WVMT-11-A	Manganese	2001
Long Run	WVMT-11-B	Manganese	2001
Berry Run	WVMT-11-B-1	Manganese	2001
Three Fork Creek	WVMT-12	Manganese	2001
Raccoon Creek	WVMT-12-C	Manganese	2001
Little Raccoon Creek	WVMT-12-C-2	Manganese	2001
Brains Creek	WVMT-12-G-2	Manganese	2001
Birds Creek	WVMT-12-H	Manganese	2001
Squires Creek	WVMT-12-H-1	Manganese	2001
Sandy Creek	WVMT-18	Manganese	2001

WEST VIRGINIA

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Glade Run	WVMT-18-C	Manganese	2001
Little Sandy Creek	WVMT-18-E	Manganese	2001
Maple Run	WVMT-18-E-1	Manganese	2001
Left Fork/Little Sandy Creek	WVMT-18-E-3	Manganese	2001
Left Fork/Sandy Creek	WVMT-18-G	Manganese	2001
Frost Run	WVMT-24-A	Manganese	2001
Fords Run	WVMT-27	Manganese	2001
Anglins Run	WVMT-29	Manganese	2001
Pecks Run	WVMTB-5	Manganese	2001
UNT/Pecks Run RM 2.24	WVMTB-5-0.8A	Manganese	2001
Little Pecks Run	WVMTB-5-B	Manganese	2001
Mud Run	WVMTB-5-C	Manganese	2001
Turkey Run	WVMTB-10	Manganese	2001
Sugar Run	WVMTB-10-A	Manganese	2001
Fink Run	WVMTB-11	Manganese	2001
Mud Lick	WVMTB-11-B	Manganese	2001
Bridge Run	WVMTB-11-B.7	Manganese	2001
Swamp Run	WVMTB-29	Manganese	2001
Devil Run	WVMTM-4	Manganese	2001
Hell Run	WVMTM-6	Manganese	2001
White Oak Run	WVMTM-8	Manganese	2001
Cassity Fork	WVMTM-16	Manganese	2001
Panther Run	WVMTM-16-A	Manganese	2001
Laurel Run	WVMT-39	Manganese	2001
UNT/Tygart Valley River RM 75.2	WVMT-40.5	Manganese	2001
Grassy Run	WVMT-41	Manganese	2001
Roaring Creek	WVMT-42	Manganese	2001

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP C			
LOWER GUYANDOTTE WATERSHED - HUC# 05070102			
Limestone Branch	WVOG-48	Manganese	2004
Ed Stone Branch	WVOG-49-A	Manganese	2004
North Branch/Ed Stone Branch	WVOG-49-A-1	Manganese	2004
TUG FORK WATERSHED - HUC# 05070201			
Powdermill Branch	WVBST-3	Manganese	2002
Pigeon Creek	WVBST-24	Manganese	2002
Millstone Branch	WVBST-24-O	Manganese	2002
Sugartree Creek	WVBST-32	Manganese	2002
Williamson Creek	WVBST-33	Manganese	2002
Rutherford Branch	WVBST-40-B	Manganese	2002
Mitchell Branch	WVBST-40-C	Manganese	2002
Chafin Branch	WVBST-40-D	Manganese	2002
Lick Fork	WVBST-43-A	Manganese	2002
Panther Creek	WVBST-60	Manganese	2002
Cub Branch	WVBST-60-D	Manganese	2002
Grapevine Branch	WVBST-70-F	Manganese	2002
Beartown Branch	WVBST-70-I	Manganese	2002
Atwell Branch	WVBST-70-O	Manganese	2002
Clear Fork	WVBST-76	Manganese	2002
Shabbyroom Branch	WVBST-78-B	Manganese	2002
HoneyCamp Branch	WVBST-78-D	Manganese	2002
Coontree Branch	WVBST-78-E	Manganese	2002
Stonecoal Branch	WVBST-78-F	Manganese	2002

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Badway Branch	WVBST-78-G	Manganese	2002
Newson Branch	WVBST-78-H	Manganese	2002
Moorecamp Branch	WVBST-78-I	Manganese	2002
Left Fork/Davy Branch	WVBST-85-A	Manganese	2002
Shannon Branch	WVBST-94	Manganese	2002
Upper Shannon Branch	WVBST-95	Manganese	2002
Puncheoncamp Branch	WVBST-98-A	Manganese	2002
Little Indian Creek	WVBST-100	Manganese	2002
Jed Branch	WVBST-102	Manganese	2002
Rock Narrows Branch	WVBST-103	Manganese	2002
Harris Branch	WVBST-104	Manganese	2002
Mitchell Branch	WVBST-105	Manganese	2002
Sugarcamp Branch	WVBST-106	Manganese	2002
Grapevine Branch	WVBST-107	Manganese	2002
Sandlick Creek	WVBST-109	Manganese	2002
Right Fork/Sandlick Creek	WVBST-109-A	Manganese	2002
Left Fork/Sandlick Creek	WVBST-109-B	Manganese	2002
Adkin Branch	WVBST-110	Manganese	2002
Belcher Branch	WVBST-111	Manganese	2002
Turnhole Branch	WVBST-112	Manganese	2002
Harmon Branch	WVBST-113	Manganese	2002
South Fork/Tug Fork	WVBST-115	Manganese	2002
Tea Branch	WVBST-115-A	Manganese	2002
McClure Branch	WVBST-115-B	Manganese	2002
Jump Branch	WVBST-115-D	Manganese	2002
Spice Creek	WVBST-115-E	Manganese	2002
Laurel Branch	WVBST-115-F	Manganese	2002

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Road Fork	WVBST-115-G	Manganese	2002
Belcher Branch	WVBST-116	Manganese	2002
Loop Branch	WVBST-117	Manganese	2002
Mill Branch	WVBST-118	Manganese	2002
Dry Branch	WVBST-119	Manganese	2002
Little Creek	WVBST-120	Manganese	2002
Indian Grave Branch	WVBST-120-A	Manganese	2002
Puncheoncamp Branch	WVBST-120-B	Manganese	2002
Millseat Branch	WVBST-121	Manganese	2002
Ballard Harmon Branch	WVBST-122	Manganese	2002
Sams Branch	WVBST-123	Manganese	2002

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
HYDROLOGIC GROUP D			
LOWER NEW WATERSHED - HUC# 05050004			
Meadow Fork	WVKN-22-B	Manganese	2002
MONONGAHELA WATERSHED - HUC# 05020003			
Camp Run	WVM-2.1	Manganese	2002
UNT/Monongahela River RM 93.07	WVM-2.6	Manganese	2002
Laurel Run	WVM-2.7	Manganese	2002
West Run	WVM-3	Manganese	2002
Robinson Run	WVM-4	Manganese	2002
Crafts Run	WVM-4-A	Manganese	2002
UNT/Robinson Run RM 1.09	WVM-4-B	Manganese	2002
Scotts Run	WVM-6	Manganese	2002
Dents Run	WVM-7	Manganese	2002
UNT/Dents Run RM 3.60	WVM-7-C	Manganese	2002
Deckers Creek	WVM-8	Manganese	2002
Hartman Run	WVM-8-0.5A	Manganese	2002
UNT/Deckers Creek RM 5.70	WVM-8-A.7	Manganese	2002
Glady Run	WVM-8-D	Manganese	2002
Slabcamp Run	WVM-8-F	Manganese	2002
Dillan Creek	WVM-8-G	Manganese	2002
Laurel Run/Deckers Creek	WVM-8-H	Manganese	2002
Kanes Creek	WVM-8-I	Manganese	2002
Owl Creek	WVM-10-D	Manganese	2002
Mays Run	WVM-10-E	Manganese	2002
UNT/Booths Creek RM 6.27	WVM-10-F	Manganese	2002

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Birchfield Run	WVM-15	Manganese	2002
Parker Run	WVM-20	Manganese	2002
UNT/Monongahela River RM 123.45	WVM-20.2	Manganese	2002
Robinson Run	WVM-22-C	Manganese	2002
Mod Run	WVM-23-K	Manganese	2002
Fleming Fork	WVM-23-N-1	Manganese	2002
Whetstone Run	WVM-23-Q	Manganese	2002
Joes Run	WVM-23-R	Manganese	2002
UMT/Monongahela River RM 126.94	WVM-22.9	Manganese	2001
UNT/Monongahela River RM 128.55	WVM-25.9	Manganese	2002

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Supplemental Table E - Manganese TMDLs

HYDROLOGIC GROUP E

UPPER GUYANDOTTE WATERSHED - HUC# 05070101

Stream Name	Stream Code	Criteria	TMDL Date
Coal Branch	WVOG-65-A	Manganese	2004
Copperas Mine Fork	WVOG-65-B	Manganese	2004
Mud Fork	WVOG-65-B-1	Manganese	2004
Lower Dempsey Branch	WVOG-65-B-1-A	Manganese	2004
Ellis Branch	WVOG-65-B-1-B	Manganese	2004
Upper Dempsey Branch	WVOG-65-B-1-E	Manganese	2004
Trace Fork	WVOG-65-B-4	Manganese	2004
Mudlick Branch	WVOG-75-C.5	Manganese	2004
Toney Fork	WVOG-76-L	Manganese	2004
Muzzle Creek	WVOG-92-I	Manganese	2004
Buffalo Creek	WVOG-92-K	Manganese	2004
Kezee Fork	WVOG-92-K-1	Manganese	2004
Mudlick Fork	WVOG-92-K-2	Manganese	2004
Pad Fork	WVOG-92-Q	Manganese	2004
Righthand Fork/Pad Fork	WVOG-92-Q-1	Manganese	2004
Sturgeon Branch	WVOG-96-A	Manganese	2004
Road Branch	WVOG-96-B	Manganese	2004
Elk Trace Branch	WVOG-96-C	Manganese	2004
Toler Hollow	WVOG-96-F	Manganese	2004
McDonald Fork	WVOG-96-H	Manganese	2004
Reedy Branch	WVOG-99	Manganese	2004
Lower Road Branch	WVOGC-12	Manganese	2004
Milam Fork	WVOGC-16-M	Manganese	2004
Trough Fork	WVOGC-16-P	Manganese	2004

Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Toney Fork	WVOGC-19	Manganese	2004
Crane Fork	WVOGC-26	Manganese	2004
Indian Creek	WVOG-110	Manganese	2004
Brier Creek	WVOG-110-A	Manganese	2004
Marsh Fork	WVOG-110-A-2	Manganese	2004
Pinnacle Creek	WVOG-124	Manganese	2004
Smith Branch	WVOG-124-D	Manganese	2004
Laurel Branch/Pinnacle Creek	WVOG-124-H	Manganese	2004
Spider Creek	WVOG-124-I	Manganese	2004
Cabin Creek	WVOG-127	Manganese	2004
Joe Branch	WVOG-128	Manganese	2004
Long Branch	WVOG-129	Manganese	2004
Still Run	WVOG-130	Manganese	2004
Barkers Creek	WVOG-131	Manganese	2004
Hickory Branch	WVOG-131-B	Manganese	2004
Gooney Otter Creek	WVOG-131-F	Manganese	2004
Jims Branch	WVOG-131-F-1	Manganese	2004
Noseman Branch	WVOG-131-F-2	Manganese	2004
Measle Fork	WVOG-134-D	Manganese	2004
Left Fork/Allen Creek	WVOG-135-A	Manganese	2004
Devils Fork	WVOG-137	Manganese	2004
Winding Gulf	WVOG-138	Manganese	2004
Stonecoal Creek	WVOG-139	Manganese	2004

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
WEST FORK WATERSHED - HUC# 05020002			
Booths Creek	WVMW-2	Manganese	2002
UNT/Booths Creek RM 1.39	WVMW-2-0.1A	Manganese	2002
UNT/Booths Creek RM 3.58	WVMW-2-0.5A	Manganese	2002
Hog Lick Run	WVMW-2-A	Manganese	2002
Sweep Run	WVMW-2-C	Manganese	2002
Horners Run	WVMW-2-D	Manganese	2002
Purdys Run	WVMW-2-D-1	Manganese	2002
UNT/Booths Creek RM 8.22	WVMW-2-D.5	Manganese	2002
Coons Run	WVMW-3	Manganese	2002
Elklick Run	WVMW-7-C	Manganese	2002
UNT/West Fork River RM 11.44	WVMW-7.1	Manganese	2002
Laurel Run	WVMW-8	Manganese	2002
UNT/West Fork River RM 13.10	WVMW-8.5	Manganese	2002
Mudlick Run	WVMW-9	Manganese	2002
UNT/West Fork River RM 13.91	WVMW-9.5	Manganese	2002
Browns Run	WVMW-10	Manganese	2002
Shinns Run	WVMW-11	Manganese	2002
Robinson Run	WVMW-12	Manganese	2002
Pigotts Run	WVMW-12-A	Manganese	2002
UNT/Robinson Run RM 1.08	WVMW-12-B	Manganese	2002
Tenmile Creek	WVMW-13	Manganese	2002
Jack Run	WVMW-13-0.5A	Manganese	2002
Little Tenmile Creek	WVMW-13-B	Manganese	2002
Peters Run	WVMW-13-B-1	Manganese	2002
UNT/Little Tenmile Creek RM 1.91	WVMW-13-B-1.5	Manganese	2002
Bennett Run	WVMW-13-B-2	Manganese	2002

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Laurel Run/Little Tenmile Creek	WVMW-13-B-4	Manganese	2002
Big Elk Creek	WVMW-13-B-6	Manganese	2002
Mudlick Run	WVMW-13-B-9	Manganese	2002
Isaac Creek	WVMW-13-C	Manganese	2002
Little Isaac Creek	WVMW-13-C-1	Manganese	2002
Gregory Run	WVMW-13-D	Manganese	2002
Katy Lick Run	WVMW-13-E	Manganese	2002
UNT/Tenmile Creek RM 10.82	WVMW-13-E.7	Manganese	2002
Rockcamp Run	WVMW-13-F	Manganese	2002
Little Rockcamp Run	WVMW-13-F-1	Manganese	2002
Cherrycamp Run	WVMW-13-I-2	Manganese	2002
Patterson Fork	WVMW-13-I-3	Manganese	2002
Coburn Fork	WVMW-13-N	Manganese	2002
Shaw Run	WVMW-13-N-1	Manganese	2002
UNT/West Fork River RM 20.42	WVMW-14.2	Manganese	2002
Simpson Creek	WVMW-15	Manganese	2002
UNT/Simpson Creek RM 1.23	WVMW-15-0.5A	Manganese	2002
Jack Run	WVMW-15-A	Manganese	2002
Smith Run	WVMW-15-B	Manganese	2002
Jerry Run	WVMW-15-H	Manganese	2002
Berry Run	WVMW-15-I	Manganese	2002
Right Fork/Simpson Creek	WVMW-15-J	Manganese	2002
UNT/Right Fork RM 0.33/Simpson Creek	WVMW-15-J-0.3	Manganese	2002
Buck Run	WVMW-15-J-1	Manganese	2002
Sand Lick Run	WVMW-15-J-2	Manganese	2002
Gabe Fork	WVMW-15-J-3	Manganese	2002
UNT/Simpson Creek RM 21.92	WVMW-15-J.5	Manganese	2002

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Bartlett Run	WVMW-15-K	Manganese	2002
UNT/Simpson Creek RM 22.72	WVMW-15-K.7	Manganese	2002
West Branch/Simpson Creek	WVMW-15-L	Manganese	2002
UNT/West Branch RM 0.63/Simpson Creek	WVMW-15-L-0.5	Manganese	2002
Stillhouse Run	WVMW-15-L-1	Manganese	2002
UNT/West Branch RM 1.57/Simpson Creek	WVMW-15-L-2	Manganese	2002
Camp Run	WVMW-15-M	Manganese	2002
UNT/Simpson Creek RM 26.94	WVMW-15-N	Manganese	2002
Lambert Run	WVMW-16	Manganese	2002
Jack Run	WVMW-17	Manganese	2002
Fall Run	WVMW-18	Manganese	2002
Crooked Run	WVMW-19	Manganese	2002
Simpson Fork	WVMW-20-B	Manganese	2002
Elk Creek	WVMW-21	Manganese	2002
Murphy Run	WVMW-21-A	Manganese	2002
Nutter Run	WVMW-21-D	Manganese	2002
Turkey Run	WVMW-21-E	Manganese	2002
Hooppole Run	WVMW-21-F	Manganese	2002
Brushy Fork	WVMW-21-G	Manganese	2002
Coplin Run	WVMW-21-G-1	Manganese	2002
Gnatty Creek	WVMW-21-M	Manganese	2002
Right Branch/Gnatty Creek	WVMW-21-M-5	Manganese	2002
Charity Fork	WVMW-21-M-5-A	Manganese	2002
Birds Run	WVMW-21-O	Manganese	2002
Arnold Run	WVMW-21-P	Manganese	2002
Isaacs Run	WVMW-21-Q	Manganese	2002
Stewart Run	WVMW-21-S	Manganese	2002

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Supplemental Table E - Manganese TMDLs

Stream Name	Stream Code	Criteria	TMDL Date
Browns Creek	WVMW-23	Manganese	2002
Coburns Creek	WVMW-24	Manganese	2002
Sycamore Creek	WVMW-25	Manganese	2002
Lost Creek	WVMW-26	Manganese	2002
UNT/Lost Creek RM 3.32	WVMW-26-0.5A	Manganese	2002
Bonds Run	WVMW-26-A	Manganese	2002
Buffalo Creek	WVMW-27	Manganese	2002
Mare Run	WVMW-36-C.5	Manganese	2002

Supplemental Table F - New Listings for 2010

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP A							
CHEAT WATERSHED - HUC# 05020004							
Beaver Creek	WVMC-12-B-1	Aluminum (d) (trout)	Unknown	7.4	Entire length	2010	No
		Iron (trout) AQ	Unknown	7.4	Entire length	2010	No
UNT/Greens Run RM 6.88	WVMC-16-E	CNA-Biological	Unknown	1.0	Entire length	2024	No
UNT/Beaver Creek RM 11.91	WVMC-60-D-5-H	CNA-Biological	Unknown	2.1	Entire length	2024	No
SOUTH BRANCH POTOMAC WATERSHED - HUC# 02070001							
UNT/South Branch Potomac River RM 10.37	WVPSB-1.65	CNA-Biological	Unknown	2.0	Entire length	2024	No
UPPER KANAWHA WATERSHED - HUC# 05050006							
New West Hollow	WVK-58-B.8-1	CNA-Biological	Unknown	1.2	Entire length	2024	No
Toms Fork	WVK-61-K	CNA-Biological	Unknown	1.8	Entire length	2024	No
Long Branch	WVK-65-M-1	Aluminum (d)	Unknown	4.1	Entire length	2024	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP B							
COAL WATERSHED - HUC# 05050009							
Fuquay Creek	WVKC-8	CNA-Biological	Unknown	5.4	Entire length	2025	No
Spruce Fork	WVKC-10-T	CNA-Biological	Unknown	31.0	Entire length	2025	No
ELK WATERSHED - HUC# 05050007							
Magazine Branch	WVKE-1	Fecal Coliform	Unknown	2.3	Entire length	2010	No
		Iron	Unknown	2.3	Entire length	2010	No
Elk Twomile Creek	WVKE-2	Fecal Coliform	Unknown	7.6	Entire length	2010	No
Valley Grove Branch	WVKE-2-B	Fecal Coliform	Unknown	2.3	Entire length	2010	No
Green Bottom	WVKE-2-E	Fecal Coliform	Unknown	0.9	Entire length	2010	No
Newhouse Branch	WVKE-3	Fecal Coliform	Unknown	2.0	Entire length	2010	No
Coopers Creek	WVKE-7	Fecal Coliform	Unknown	6.5	Entire length	2010	No
Mile Fork	WVKE-7-A	Fecal Coliform	Unknown	2.7	Entire length	2010	No
		Iron	Unknown	2.7	Entire length	2010	No
Kaufman Branch	WVKE-7-E	Fecal Coliform	Unknown	1.0	Entire length	2010	No
		Iron	Unknown	1.0	Entire length	2010	No
Indian Creek	WVKE-8	CNA-Biological	Unknown	6.2	Entire length	2010	No
Little Sandy Creek	WVKE-9	Iron	Unknown	18.6	Entire length	2010	No
Wills Creek	WVKE-9-B	CNA-Biological	Unknown	8.6	Entire length	2010	No
		Fecal Coliform	Unknown	8.6	Entire length	2010	No
Big Fork	WVKE-9-B-1	CNA-Biological	Unknown	1.6	Entire length	2010	No
		Fecal Coliform	Unknown	1.6	Entire length	2010	No
Aarons Fork	WVKE-9-C	CNA-Biological	Unknown	6.0	Entire Length	2010	No
		Fecal Coliform	Unknown	6.0	Entire Length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Bullskin Branch	WVKE-9-E	Fecal Coliform	Unknown	1.2	Entire length	2010	No
Wolfpen Branch	WVKE-9-F	Fecal Coliform	Unknown	1.6	Entire length	2010	No
Ruffner Branch	WVKE-9-G	Fecal Coliform	Unknown	1.3	Entire length	2010	No
Poca Fork	WVKE-9-I	CNA-Biological	Unknown	3.2	Entire length	2010	No
		Fecal Coliform	Unknown	3.2	Entire length	2010	No
		Iron	Unknown	3.2	Entire length	2010	No
Patterson Fork	WVKE-9-I-1	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Jakes Run	WVKE-9-J	Fecal Coliform	Unknown	2.0	Entire length	2010	No
Hurricane Branch	WVKE-9-P	CNA-Biological	Unknown	1.7	Entire length	2010	No
		Fecal Coliform	Unknown	1.7	Entire length	2010	No
Pinch Creek	WVKE-10	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Narrow Branch	WVKE-13	Fecal Coliform	Unknown	1.5	Entire length	2010	No
Blue Creek	WVKE-14	CNA-Biological	Unknown	3.0	RM 22.3 to HW	2010	No
		Iron	Unknown	25.3	Entire length	2010	No
Slack Branch	WVKE-14-G	Fecal Coliform	Unknown	1.6	Entire length	2010	No
		pH	Unknown	1.6	Entire length	2010	No
Whiteoak Fork	WVKE-14-G-2	Aluminum (d)	Unknown	3.0	Entire length	2010	No
		pH	Unknown	3.0	Entire length	2010	No
UNT/Whiteoak Fork RM 1.33	WVKE-14-G-2-B	Aluminum (d)	Unknown	1.0	Entire length	2010	No
		CNA-Biological	Unknown	1.0	Entire length	2010	No
		pH	Unknown	1.0	Entire length	2010	No
Joes Hollow	WVKE-14-K	pH	Unknown	1.0	Entire length	2010	No
Mudlick Branch	WVKE-14-M-2	Aluminum (d)	Unknown	1.6	Entire length	2010	No
		pH	Unknown	1.6	Entire length	2010	No
Hidden Hollow	WVKE-14-M-4	Aluminum (d)	Unknown	1.5	Entire length	2010	No
		pH	Unknown	1.5	Entire length	2010	No
Fivemile Fork	WVKE-14-M-5	pH	Unknown	2.3	Entire length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Middle Fork/Blue Creek	WVKE-14-O	Fecal Coliform	Unknown	7.5	Entire length	2010	No
Falling Rock Creek	WVKE-19	Fecal Coliform	Unknown	16.0	Entire length	2010	No
UNT/Falling Rock Creek RM 7.04	WVKE-19-C.8	Fecal Coliform	Unknown	0.6	Entire length	2010	No
Horse Fork	WVKE-19-G	pH	Unknown	3.6	Entire length	2010	No
Jordan Creek	WVKE-20	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Leatherwood Creek	WVKE-21	CNA-Biological	Unknown	5.1	Entire length	2010	No
		Fecal Coliform	Unknown	5.1	Entire length	2010	No
Big Sandy Creek	WVKE-23	Iron	Unknown	24.4	Entire length	2010	No
Left Hand Creek	WVKE-23-D	Fecal Coliform	Unknown	8.0	Entire length	2010	No
Hurricane Creek	WVKE-23-D-3	Fecal Coliform	Unknown	6.7	Entire length	2010	No
Cottontree Run	WVKE-23-D-4	Fecal Coliform	Unknown	5.1	Entire length	2010	No
Coleman Run	WVKE-23-D-6	Fecal Coliform	Unknown	0.9	Entire length	2010	No
Left Hand Run	WVKE-23-L	Fecal Coliform	Unknown	6.8	Entire length	2010	No
		Iron	Unknown	6.8	Entire length	2010	No
Granny Creek	WVKE-23-N	Fecal Coliform	Unknown	6.3	Entire length	2010	No
Middle Fork/Big Sandy Creek	WVKE-23-Q	Fecal Coliform	Unknown	8.0	Entire length	2010	No
		Iron	Unknown	8.0	Entire length	2010	No
Hollywood Run	WVKE-23-Q-0.5	Fecal Coliform	Unknown	4.3	Entire length	2010	No
		Iron	Unknown	4.3	Entire length	2010	No
Left Fork/Morris Creek	WVKE-26-A	CNA-Biological	Unknown	2.2	Entire length	2010	No
Queen Shoals Creek	WVKE-27	CNA-Biological	Unknown	3.9	Entire length	2010	No
		Fecal Coliform	Unknown	3.9	Entire length	2010	No
Porter Creek	WVKE-30	Fecal Coliform	Unknown	8.9	Entire length	2010	No
UNT/Porter Creek RM 5.49	WVKE-30-L	Fecal Coliform	Unknown	1.1	Entire length	2010	No
Camp Creek	WVKE-34	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Laurel Creek	WVKE-37	Fecal Coliform	Unknown	7.6	Entire length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Laurel Fork	WVKE-37-B	Fecal Coliform	Unknown	2.5	Entire length	2010	No
Horner Fork	WVKE-37-C	Fecal Coliform	Unknown	1.5	Entire length	2010	No
Reed Fork	WVKE-37-C-1	Fecal Coliform	Unknown	1.9	Entire length	2010	No
Summers Fork	WVKE-37-D	Fecal Coliform	Unknown	2.6	Entire length	2010	No
Sycamore Creek	WVKE-41	Fecal Coliform	Unknown	12.9	Entire length	2010	No
Adonijah Fork	WVKE-41-B	Fecal Coliform	Unknown	7.1	Entire length	2010	No
Right Fork/Sycamore Creek	WVKE-41-C	Fecal Coliform	Unknown	3.8	Entire length	2010	No
Grassy Fork	WVKE-41-C-1	Fecal Coliform	Unknown	2.7	Entire length	2010	No
UNT/Elk River RM 48.53	WVKE-43.5	Aluminum (d)	Unknown	0.6	Entire length	2010	No
		pH	Unknown	0.6	Entire length	2010	No
Middle Creek	WVKE-45	CNA-Biological	Unknown	7.9	Entire length	2010	No
		Fecal Coliform	Unknown	7.9	Entire length	2010	No
		Iron	Unknown	7.9	Entire length	2010	No
Lick Branch	WVKE-45-B	Fecal Coliform	Unknown	2.0	Entire length	2010	No
		Iron	Unknown	2.0	Entire length	2010	No
Leatherwood Creek	WVKE-46	Fecal Coliform	Unknown	11.3	Entire length	2010	No
		Iron	Unknown	11.3	Entire length	2010	No
		Selenium AQ	Unknown	11.3	Entire length	2010	No
Right Fork/Leatherwood Creek	WVKE-46-C	CNA-Biological	Unknown	4.0	Entire length	2010	No
		Iron	Unknown	4.0	Entire length	2010	No
		Selenium AQ	Unknown	4.0	Entire length	2010	No
Road Fork	WVKE-46-D	CNA-Biological	Unknown	2.4	Entire length	2010	No
		Fecal Coliform	Unknown	2.4	Entire length	2010	No
		Iron	Unknown	2.4	Entire length	2010	No
		Selenium AQ	Unknown	2.4	Entire length	2010	No
Buffalo Creek	WVKE-50	Aluminum (d)	Unknown	23.8	Entire length	2010	No
		pH	Unknown	23.8	Entire length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Big Branch	WVKE-50-B-3	Selenium AQ	Unknown	2.3	Entire length	2010	No
Beech Fork	WVKE-50-B-8	pH	Unknown	4.8	Entire length	2010	No
Hickory Fork	WVKE-50-H	Fecal Coliform	Unknown	6.2	Entire length	2010	No
		Iron (trout) AQ	Unknown	6.2	Entire length	2010	No
Rockcamp Run	WVKE-50-I	Aluminum (d) (trout)	Unknown	6.5	Entire length	2010	No
		Fecal Coliform	Unknown	6.5	Entire length	2010	No
		pH	Unknown	6.5	Entire length	2010	No
Hickory Fork	WVKE-50-I-3	Aluminum (d)	Unknown	1.3	Entire length	2010	No
		pH	Unknown	1.3	Entire length	2010	No
Taylor Creek	WVKE-50-P	Aluminum (d)	Unknown	8.0	Entire length	2010	No
		CNA-Biological	Unknown	8.0	Entire length	2010	No
		pH	Unknown	8.0	Entire length	2010	No
Dille Run	WVKE-50-S	Aluminum (d)	Unknown	1.3	Entire length	2010	No
		CNA-Biological	Unknown	1.3	Entire length	2010	No
Pheasant Run	WVKE-50-T	Fecal Coliform	Unknown	1.5	Entire length	2010	TMDL Rev.
		Iron	Unknown	1.5	Entire length	2010	TMDL Rev.
		pH	Unknown	1.5	Entire length	2010	TMDL Rev.
Big Otter Creek	WVKE-64	CNA-Biological	Unknown	11.3	Entire length	2010	No
		Fecal Coliform	Unknown	11.3	Entire length	2010	No
Moore Fork	WVKE-64-D	Fecal Coliform	Unknown	3.3	Entire length	2010	No
		Iron	Unknown	3.3	Entire length	2010	No
Wilson Fork	WVKE-64-D-1	Fecal Coliform	Unknown	2.6	Entire length	2010	No
Groves Creek	WVKE-69	Fecal Coliform	Unknown	6.5	Entire length	2010	No
O'Brion Creek	WVKE-70	Fecal Coliform	Unknown	3.8	Entire length	2010	No
		Iron	Unknown	3.8	Entire length	2010	No
Road Fork	WVKE-70-A	Fecal Coliform	Unknown	2.1	Entire length	2010	No
Duck Creek	WVKE-72	Fecal Coliform	Unknown	5.3	Entire length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Tate Creek	WVKE-73	Fecal Coliform	Unknown	4.2	Entire length	2010	No
Strange Creek	WVKE-74	CNA-Biological	Unknown	16.0	Entire length	2010	No
		Fecal Coliform	Unknown	16.0	Entire length	2010	No
		Iron (trout) AQ	Unknown	16.0	Entire length	2010	No
Dille Run	WVKE-74-H	Fecal Coliform	Unknown	6.1	Entire length	2010	No
Birch River	WVKE-76	CNA-Biological	Unknown	17.6	RM 17.9 to RM 35.5	2010	No
		Fecal Coliform	Unknown	38.5	Entire length	2010	No
		Iron	Unknown	27.0	Mouth to RM 27 (Webster Co Line)	2010	No
		Iron (trout) AQ	Unknown	11.5	RM 27 (Webster Co Line) to HW	2010	No
		Selenium AQ	Unknown	35.5	Mouth to RM 35.5	2010	No
Little Birch River	WVKE-76-E	Fecal Coliform	Unknown	19.8	Entire length	2010	No
		Iron	Unknown	19.8	Entire length	2010	No
Twolick Run	WVKE-76-E-6	Fecal Coliform	Unknown	3.0	Entire length	2010	No
Carpenter Fork	WVKE-76-E-7	Fecal Coliform	Unknown	3.4	Entire length	2010	No
Powell Creek	WVKE-76-L	Fecal Coliform	Unknown	6.1	Entire length	2010	No
Jacks Run	WVKE-76-W	Aluminum (d) (trout)	Unknown	1.3	Entire length	2010	No
		Iron (trout) AQ	Unknown	1.3	Entire length	2010	No
Upper Mill Creek	WVKE-78	Fecal Coliform	Unknown	4.8	Entire length	2010	No
Sugar Creek	WVKE-83	Fecal Coliform	Unknown	3.4	Entire length	2010	No
Little Otter Creek	WVKE-84	CNA-Biological	Unknown	2.8	Entire length	2010	No
Bear Run	WVKE-84.5	Fecal Coliform	Unknown	1.5	Entire length	2010	No
Granny Creek	WVKE-87	CNA-Biological	Unknown	5.0	Entire length	2010	No
		Fecal Coliform	Unknown	5.0	Entire length	2010	No
		Iron	Unknown	5.0	Entire length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Laurel Fork	WVKE-87-B	CNA-Biological	Unknown	1.6	Entire length	2010	No
		Fecal Coliform	Unknown	1.6	Entire length	2010	No
UNT/Granny Creek RM 4.16	WVKE-87-C	Fecal Coliform	Unknown	1.4	Entire length	2010	No
		Iron	Unknown	1.4	Entire length	2010	No
Old Woman Run	WVKE-88	Fecal Coliform	Unknown	2.4	Entire length	2010	No
		Iron	Unknown	2.4	Entire length	2010	No
LOWER KANAWHA WATERSHED - HUC# 05050008							
Threemile Creek (South)	WVK-4	CNA-Biological	Unknown	3.4	Entire length	2010	No
		Fecal Coliform	Unknown	3.4	Entire length	2010	No
Threemile Creek (North)	WVK-5	Fecal Coliform	Unknown	6.9	Entire length	2010	No
Fivemile Creek	WVK-6	Fecal Coliform	Unknown	3.5	Entire length	2010	No
		Iron	Unknown	3.5	Entire length	2010	No
Little Fivemile Creek	WVK-6-A	Fecal Coliform	Unknown	1.8	Entire length	2010	No
		Iron	Unknown	1.8	Entire length	2010	No
		Dissolved Oxygen	Unknown	1.8	Entire length	2010	No
Ninemile Creek	WVK-9	Fecal Coliform	Unknown	2.4	Entire length	2010	No
Upper Ninemile Creek	WVK-9-A	CNA-Biological	Unknown	4.6	Entire length	2010	No
		Fecal Coliform	Unknown	4.6	Entire length	2010	No
Cooper Fork	WVK-10-A	Fecal Coliform	Unknown	5.7	Entire length	2010	No
		Iron	Unknown	5.7	Entire length	2010	No
UNT/Cooper Fork RM 1.41	WVK-10-A-1	Iron	Unknown	2.0	Entire length	2010	No
Pond Branch	WVK-11	Fecal Coliform	Unknown	3.1	Entire length	2010	No
UNT/Pond Branch RM 1.74	WVK-11-0.5A	Fecal Coliform	Unknown	0.6	Entire length	2010	No
		Iron	Unknown	0.6	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Thirteenmile Creek	WVK-12	Fecal Coliform	Unknown	25.7	Entire length	2010	No
		Iron	Unknown	25.7	Entire length	2010	No
Rocky Fork	WVK-12-A	Fecal Coliform	Unknown	3.0	Entire length	2010	No
		Iron	Unknown	3.0	Entire length	2010	No
Buzzard Creek	WVK-12-D	Fecal Coliform	Unknown	3.1	Entire length	2010	No
Mudlick Fork	WVK-12-E	Fecal Coliform	Unknown	6.3	Entire length	2010	No
		Iron	Unknown	6.3	Entire length	2010	No
Poplar Fork	WVK-12-F	Fecal Coliform	Unknown	6.2	Entire length	2010	No
		Iron	Unknown	6.2	Entire length	2010	No
Little Sixteenmile Creek	WVK-13	Fecal Coliform	Unknown	9.4	Entire length	2010	No
Sixteenmile Creek	WVK-14	Fecal Coliform	Unknown	10.5	Entire length	2010	No
Eighteenmile Creek	WVK-16	Fecal Coliform	Unknown	36.2	Entire length	2010	No
		Iron	Unknown	36.2	Entire length	2010	No
Jakes Run	WVK-16-B	Fecal Coliform	Unknown	1.9	Entire length	2010	No
Right Fork/Eighteenmile Creek	WVK-16-J	Fecal Coliform	Unknown	2.6	Entire length	2010	No
Saltlick Creek	WVK-16-J-3	Fecal Coliform	Unknown	2.9	Entire length	2010	No
Cherry Fork	WVK-16-M	Fecal Coliform	Unknown	4.9	Entire length	2010	No
Buckelew Hollow	WVK-16-R	Fecal Coliform	Unknown	1.7	Entire length	2010	No
		Iron	Unknown	1.7	Entire length	2010	No
Cottrell Run	WVK-16-S	Fecal Coliform	Unknown	1.3	Entire length	2010	No
		Iron	Unknown	1.3	Entire length	2010	No
Five and Twenty Mile Creek	WVK-19	Fecal Coliform	Unknown	9.0	Entire length	2010	No
Evans Creek	WVK-19-B	Fecal Coliform	Unknown	4.0	Entire length	2010	No
UNT/Five and Twenty Mile Creek RM 7.41	WVK-19-D	Fecal Coliform	Unknown	2.1	Entire length	2010	No
UNT/Little Buffalo Creek RM 1.17	WVK-20-A	Fecal Coliform	Unknown	1.3	Entire length	2010	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Hurricane Creek	WVK-22	Fecal Coliform	Unknown	30.0	Entire length	2010	No
		Iron	Unknown	30.0	Entire length	2010	No
Poplar Fork	WVK-22-B	Fecal Coliform	Unknown	11.8	Entire length	2010	No
		Iron	Unknown	11.8	Entire length	2010	No
Cow Creek	WVK-22-B-2	Fecal Coliform	Unknown	4.4	Entire length	2010	No
		Iron	Unknown	4.4	Entire length	2010	No
Long Branch	WVK-22-B-3	Fecal Coliform	Unknown	2.8	Entire length	2010	No
		Iron	Unknown	2.8	Entire length	2010	No
Crooked Creek	WVK-22-B-5	Fecal Coliform	Unknown	3.4	Entire length	2010	No
		Iron	Unknown	3.4	Entire length	2010	No
UNT/Crooked Creek RM 0.72	WVK-22-B-5-B	Fecal Coliform	Unknown	1.3	Entire length	2010	No
		Iron	Unknown	1.3	Entire length	2010	No
Sleepy Creek	WVK-22-C	Fecal Coliform	Unknown	3.9	Entire length	2010	No
		Iron	Unknown	3.9	Entire length	2010	No
Trace Creek	WVK-22-C-2	Fecal Coliform	Unknown	4.4	Entire length	2010	No
		Iron	Unknown	4.4	Entire length	2010	No
Mill Creek	WVK-22-F	CNA-Biological	Unknown	4.0	Entire length	2010	No
		Fecal Coliform	Unknown	4.0	Entire length	2010	No
		Iron	Unknown	4.0	Entire length	2010	No
Rider Creek	WVK-22-J	Fecal Coliform	Unknown	1.7	Entire length	2010	No
Sams Fork	WVK-22-K	Fecal Coliform	Unknown	1.3	Entire length	2010	No
Little Hurricane Creek	WVK-24	Fecal Coliform	Unknown	6.7	Entire length	2010	No
		Iron	Unknown	6.7	Entire length	2010	No
Farley Creek	WVK-27	Fecal Coliform	Unknown	2.0	Entire length	2010	No
Bills Creek	WVK-28	CNA-Biological	Unknown	3.4	Entire length	2010	No
		Fecal Coliform	Unknown	3.4	Entire length	2010	No

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Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Armour Creek	WVK-30	Fecal Coliform	Unknown	3.7	Entire length	2010	No
		Iron	Unknown	3.7	Entire length	2010	No
Blakes Creek	WVK-30-A	CNA-Biological	Unknown	2.8	Entire length	2010	No
		Fecal Coliform	Unknown	2.8	Entire length	2010	No
Scary Creek	WVK-32	CNA-Biological	Unknown	5.8	Entire length	2010	No
		Fecal Coliform	Unknown	5.8	Entire length	2010	No
		Iron	Unknown	5.8	Entire length	2010	No
UNT/Scary Creek RM 0.14	WVK-32-0.1A	Fecal Coliform	Unknown	0.8	Entire length	2010	No
		Iron	Unknown	0.8	Entire length	2010	No
Rockstep Run	WVK-32-A	Fecal Coliform	Unknown	2.3	Entire length	2010	No
		Iron	Unknown	2.3	Entire length	2010	No
UNT/UNT RM 0.33/Scary Creek RM 2.13	WVK-32-B-1	Fecal Coliform	Unknown	1.5	Entire length	2010	No
		Iron	Unknown	1.5	Entire length	2010	No
Gallatin Branch	WVK-33	Fecal Coliform	Unknown	1.6	Entire length	2010	No
Davis Creek	WVK-39	CNA-Biological	Unknown	10.5	Mouth to RM 10.5	2010	No
		Fecal Coliform	Unknown	15.6	Entire length	2010	No
		Iron	Unknown	15.6	Entire length	2010	No
Ward Hollow	WVK-39-A	Fecal Coliform	Unknown	1.7	Entire length	2010	No
Trace Fork	WVK-39-B	CNA-Biological	Unknown	6.3	Entire length	2010	No
		Fecal Coliform	Unknown	6.3	Entire length	2010	No
		Iron	Unknown	6.3	Entire length	2010	No
Middle Fork/Davis Creek	WVK-39-E	Fecal Coliform	Unknown	6.0	Entire length	2010	No
Rays Branch	WVK-39-F	Fecal Coliform	Unknown	2.7	Entire length	2010	No
Coal Hollow	WVK-39-J	Fecal Coliform	Unknown	1.6	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Cane Fork	WVK-39-L	CNA-Biological	Unknown	2.8	Entire length	2010	No
		Fecal Coliform	Unknown	2.8	Entire length	2010	No
Kanawha Fork	WVK-39-M	Fecal Coliform	Unknown	2.4	Entire length	2010	No
Hoffman Hollow	WVK-39-M-1-A	pH	Unknown	2.3	Entire length	2010	No
POCATALICO RIVER SUBWATERSHED							
Pocatalico River	WVKP	Fecal Coliform	Unknown	73.0	Entire length	2010	No
		Iron	Unknown	73.0	Entire length	2010	No
UNT/Pocatalico River RM 8.52	WVKP-2.5	Aluminum (d)	Unknown	0.7	Entire length	2010	No
		pH	Unknown	0.7	Entire length	2010	No
Kelly Creek	WVKP-3	pH	Unknown	1.1	Entire length	2010	No
Harmond Creek	WVKP-4	Fecal Coliform	Unknown	2.8	Entire length	2010	No
UNT/Harmond Creek RM 1.00	WVKP-4-B	Aluminum (d)	Unknown	0.7	Entire length	2010	No
		pH	Unknown	0.7	Entire length	2010	No
Rocky Fork	WVKP-5	Fecal Coliform	Unknown	6.9	Entire length	2010	No
		Iron	Unknown	6.9	Entire length	2010	No
Fisher Branch	WVKP-5-A	Fecal Coliform	Unknown	3.5	Entire length	2010	No
Wolfpen Run	WVKP-5-B	Fecal Coliform	Unknown	1.9	Entire length	2010	No
		Iron	Unknown	1.9	Entire length	2010	No
UNT/Rocky Fork RM 4.32	WVKP-5-B.5	Fecal Coliform	Unknown	2.5	Entire length	2010	No
		Iron	Unknown	2.5	Entire length	2010	No
Howard Fork	WVKP-5-C	Fecal Coliform	Unknown	3.3	Entire length	2010	No
		Iron	Unknown	3.3	Entire length	2010	No
Martin Branch	WVKP-7	Fecal Coliform	Unknown	4.2	Entire length	2010	No
		Iron	Unknown	4.2	Entire length	2010	No
Schoolhouse Branch	WVKP-8	Fecal Coliform	Unknown	0.8	Entire length	2010	No
		Iron	Unknown	0.8	Entire length	2010	No
Campbells Branch	WVKP-8.5	Fecal Coliform	Unknown	1.1	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Kelly Creek	WVKP-9	CNA-Biological	Unknown	5.0	Entire length	2010	No
		Fecal Coliform	Unknown	5.0	Entire length	2010	No
		Iron	Unknown	5.0	Entire length	2010	No
UNT/Kelly Creek RM 0.51	WVKP-9-0.5A	Iron	Unknown	0.9	Entire length	2010	No
		pH	Unknown	0.9	Entire length	2010	No
Spring Branch	WVKP-9-A	Fecal Coliform	Unknown	1.4	Entire length	2010	No
		Iron	Unknown	1.4	Entire length	2010	No
Frog Creek	WVKP-10	Fecal Coliform	Unknown	7.7	Entire length	2010	No
		Iron	Unknown	7.7	Entire length	2010	No
Derrick Creek	WVKP-12	Fecal Coliform	Unknown	3.9	Entire length	2010	No
Grapevine Creek	WVKP-16	Fecal Coliform	Unknown	6.5	Entire length	2010	No
Right Fork	WVKP-16-A	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Boardtree Run	WVKP-16-B	Fecal Coliform	Unknown	1.7	Entire length	2010	No
Pocatalico Creek	WVKP-17	CNA-Biological	Unknown	13.5	Entire length	2010	No
		Fecal Coliform	Unknown	13.5	Entire length	2010	No
		Iron	Unknown	13.5	Entire length	2010	No
Middle Fork/Pocatalico Creek	WVKP-17-B	CNA-Biological	Unknown	14.5	Entire length	2010	No
		Fecal Coliform	Unknown	14.5	Entire length	2010	No
		Iron	Unknown	14.5	Entire length	2010	No
Allen Fork	WVKP-17-C	Fecal Coliform	Unknown	6.5	Entire length	2010	No
Raccoon Creek	WVKP-20	Fecal Coliform	Unknown	3.0	Entire length	2010	No
Leatherwood Creek	WVKP-22	Fecal Coliform	Unknown	4.2	Entire length	2010	No
Coleman Fork	WVKP-28-A	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Straight Creek	WVKP-29	CNA-Biological	Unknown	2.5	Entire length	2010	No
Flat Fork	WVKP-33	Fecal Coliform	Unknown	12.6	Entire length	2010	No
Higby Run	WVKP-33-B	Fecal Coliform	Unknown	4.4	Entire length	2010	No
Cox Fork	WVKP-33-E	Fecal Coliform	Unknown	5.2	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Cabbage Fork	WVKP-33-G	Fecal Coliform	Unknown	2.2	Entire length	2010	No
McKown Creek	WVKP-37	CNA-Biological	Unknown	2.6	Entire length	2010	No
		Fecal Coliform	Unknown	2.6	Entire length	2010	No
Johnson Creek	WVKP-38	Fecal Coliform	Unknown	7.5	Entire length	2010	No
Greathouse Hollow	WVKP-38-0.8A	Fecal Coliform	Unknown	0.7	Entire length	2010	No
Big Lick Run	WVKP-39	Fecal Coliform	Unknown	6.0	Entire length	2010	No
Silcott Fork	WVKP-39-A	Fecal Coliform	Unknown	2.7	Entire length	2010	No
		Iron	Unknown	2.7	Entire length	2010	No
Rush Creek	WVKP-41	Fecal Coliform	Unknown	3.8	Entire length	2010	No
Laurel Fork	WVKP-43	Fecal Coliform	Unknown	3.8	Entire length	2010	No

NORTH BRANCH POTOMAC WATERSHED - HUC# 02070002

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Green Spring Run	WVPNB-1	Fecal Coliform	Unknown	6.1	Entire length	2010	No
Plum Run	WVPNB-4-A	Fecal Coliform	Unknown	5.3	Entire length	2010	No
UNT/Painter Run RM 0.91	WVPNB-4-C-2	Fecal Coliform	Unknown	2.8	Entire length	2010	No
Horseshoe Creek	WVPNB-4-C.5	CNA-Biological	Unknown	5.3	Entire length	2010	No
		Fecal Coliform	Unknown	5.3	Entire length	2010	No
Cabin Run	WVPNB-4-J	Fecal Coliform	Unknown	9.8	Entire length	2010	No
Pargut Run	WVPNB-4-J-1	Fecal Coliform	Unknown	3.4	Entire length	2010	No
UNT/Patterson Creek RM 16.25	WVPNB-4-J.5	Fecal Coliform	Unknown	4.0	Entire length	2010	No
Beaver Run	WVPNB-4-N	Fecal Coliform	Unknown	5.1	Entire length	2010	No
Mill Creek	WVPNB-4-S	Fecal Coliform	Unknown	5.6	Entire length	2010	No
Elliber Run	WVPNB-4-V	Fecal Coliform	Unknown	4.8	Entire length	2010	No
Mikes Run	WVPNB-4-W	Fecal Coliform	Unknown	8.1	Entire length	2010	No
North Fork/Patterson Creek	WVPNB-4-EE	Fecal Coliform	Unknown	9.4	Entire length	2010	No
Elklick Run	WVPNB-4-EE-13	Fecal Coliform	Unknown	4.1	Entire length	2010	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
UNT/North Fork RM 8.37/Patterson Creek	WVPNB-4-EE-14	Fecal Coliform	Unknown	4.1	Entire length	2010	No
Middle Fork/Patterson Creek	WVPNB-4-FF	CNA-Biological	Unknown	5.9	Entire length	2010	No
		Fecal Coliform	Unknown	5.9	Entire length	2010	No
UNT/New Creek RM 1.30	WVPNB-7-0.5A	Fecal Coliform	Unknown	1.4	Entire length	2010	No
Stony Run	WVPNB-7-A	Fecal Coliform	Unknown	3.0	Entire length	2010	No
Block Run	WVPNB-7-C	Fecal Coliform	Unknown	3.9	Entire length	2010	No
UNT/New Creek RM 4.26	WVPNB-7-C.4	Fecal Coliform	Unknown	2.5	Entire length	2010	No
King Run	WVPNB-7-E	Fecal Coliform	Unknown	3.3	Entire length	2010	No

TYGART VALLEY WATERSHED - HUC# 05020001

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Squires Creek	WVMT-12-H-1	CNA-Biological	Unknown	4.5	Entire length	2025	No
MIDDLE FORK RIVER SUBWATERSHED							
Middle Fork River	WVMTM	CNA-Biological	Unknown	5.8	RM 23.1 (Long Run) to RM	2025	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP C							
GAULEY WATERSHED - HUC# 05050005							
Meadow Creek	WVKG-19-P	Iron	Unknown	10.0	Entire length	2021	No
UNT/Meadow Creek RM 5.37	WVKG-19-P-0.8	Iron	Unknown	0.9	Entire length	2021	No
Elklick Run	WVKG-34-G-5	Iron (trout) AQ	Unknown	1.9	Entire length	2021	No
LOWER GUYANDOTTE WATERSHED - HUC# 05070102							
Trace Creek	WVOGM-19	CNA-Biological	Unknown	3.0	Entire length	2021	No
MIDDLE OHIO NORTH WATERSHED - HUC# 05030201							
Atward Run	WVO-53-H	Iron	Unknown	1.3	Entire length	2011	No
Cow Creek	WVO-55	Fecal Coliform	Unknown	9.4	Entire length	2011	No
French Creek	WVO-57	Fecal Coliform	Unknown	7.6	Entire length	2011	No
Right Fork/French Creek	WVO-57-E	Fecal Coliform	Unknown	3.9	Entire length	2011	No
Left Fork/French Creek	WVO-57-F	Fecal Coliform	Unknown	4.3	Entire length	2011	No
Sugarcamp Run	WVO-63	Fecal Coliform	Unknown	2.0	Entire length	2011	No
		Iron	Unknown	2.0	Entire length	2011	No
Cow Hollow Run	WVO-66	Fecal Coliform	Unknown	2.2	Entire length	2011	No
Fishing Creek	WVO-69	Fecal Coliform	Unknown	23.0	Entire length	2011	No
		Iron	Unknown	23.0	Entire length	2011	No
Doolin Run	WVO-69-A	Fecal Coliform	Unknown	5.3	Entire length	2011	No
Little Fishing Creek	WVO-69-C	Fecal Coliform	Unknown	20.3	Entire length	2011	No
		Iron	Unknown	20.3	Entire length	2011	No
Scheidler Run	WVO-69-C-5	Fecal Coliform	Unknown	3.6	Entire length	2011	No
Rush Run	WVO-69-C-7	Fecal Coliform	Unknown	3.3	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
State Run	WVO-69-F	Iron	Unknown	4.1	Entire length	2011	No
Brush Run	WVO-69-H	Fecal Coliform	Unknown	4.0	Entire length	2011	No
		Iron	Unknown	4.0	Entire length	2011	No
Crow Run	WVO-69-J	Fecal Coliform	Unknown	4.7	Entire length	2011	No
South Fork/Fishing Creek	WVO-69-N	Fecal Coliform	Unknown	20.4	Entire length	2011	No
		Iron	Unknown	20.4	Entire length	2011	No
Upper Run	WVO-69-N-3	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Buffalo Run	WVO-69-N-5	CNA-Biological	Unknown	6.1	Entire length	2011	No
		Fecal Coliform	Unknown	6.1	Entire length	2011	No
		Iron	Unknown	6.1	Entire length	2011	No
Richwood Run	WVO-69-N-6	Fecal Coliform	Unknown	4.9	Entire length	2011	No
Arches Fork	WVO-69-N-7	CNA-Biological	Unknown	6.2	Entire length	2011	No
		Fecal Coliform	Unknown	6.2	Entire length	2011	No
		Iron	Unknown	6.2	Entire length	2011	No
Slabcamp Run	WVO-69-N-7-A	Fecal Coliform	Unknown	1.9	Entire length	2011	No
		Iron	Unknown	1.9	Entire length	2011	No
Fallen Timber Run	WVO-69-N-8	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
		Iron	Unknown	3.6	Entire length	2011	No
Price Run	WVO-69-N-9	Fecal Coliform	Unknown	4.4	Entire length	2011	No
		Iron	Unknown	4.4	Entire length	2011	No
Buck Run	WVO-69-N-9-B	Fecal Coliform	Unknown	1.9	Entire length	2011	No
Stout Run	WVO-69-N-11	Fecal Coliform	Unknown	1.5	Entire length	2011	No
Trader Fork	WVO-69-N-12	Fecal Coliform	Unknown	3.0	Entire length	2011	No
North Fork/Fishing Creek	WVO-69-O	Fecal Coliform	Unknown	16.1	Entire length	2011	No
		Iron	Unknown	16.1	Entire length	2011	No
Maud Run	WVO-69-O-3	Fecal Coliform	Unknown	2.3	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Willey Fork	WVO-69-O-6	Fecal Coliform	Unknown	7.4	Entire length	2011	No
Morgan Run	WVO-69-O-6-E	Fecal Coliform	Unknown	1.9	Entire length	2011	No
Williams Run	WVO-70	Fecal Coliform	Unknown	1.7	Entire length	2011	No
Proctor Creek	WVO-72	CNA-Biological	Unknown	9.1	Entire length	2011	No
MIDDLE ISLAND CREEK SUBWATERSHED							
McKim Creek	WVOMI-4	CNA-Biological	Unknown	4.6	Mouth to RM 4.6	2011	No
		Fecal Coliform	Unknown	20.4	Entire length	2011	No
Bogart Run	WVOMI-6	Fecal Coliform	Unknown	1.4	Entire length	2011	No
Sugar Creek	WVOMI-9	Fecal Coliform	Unknown	15.0	Entire length	2011	No
Allen Run	WVOMI-13	Fecal Coliform	Unknown	2.1	Entire length	2011	No
		Iron	Unknown	2.1	Entire length	2011	No
Buffalo Run	WVOMI-15	Fecal Coliform	Unknown	5.0	Entire length	2011	No
UNT/Buffalo Run RM 0.99	WVOMI-15-0.3A	Fecal Coliform	Unknown	4.0	Entire length	2011	No
UNT/UNT RM 1.63/Buffalo Run RM 0.99	WVOMI-15-0.3A-5	Fecal Coliform	Unknown	1.5	Entire length	2011	No
Shrivers Run	WVOMI-18	Fecal Coliform	Unknown	1.7	Entire length	2011	No
Allen Run	WVOMI-19	Fecal Coliform	Unknown	1.2	Entire length	2011	No
Little Sancho Creek	WVOMI-21-A	Fecal Coliform	Unknown	3.6	Entire length	2011	No
Point Pleasant Creek	WVOMI-23	CNA-Biological	Unknown	10.4	Entire length	2011	No
		Fecal Coliform	Unknown	10.4	Entire length	2011	No
Pursley Creek	WVOMI-23-A	CNA-Biological	Unknown	7.5	Entire length	2011	No
		Fecal Coliform	Unknown	7.5	Entire length	2011	No
		Iron	Unknown	7.5	Entire length	2011	No
Elk Fork	WVOMI-23-B	Fecal Coliform	Unknown	14.8	Entire length	2011	No
		Iron	Unknown	14.8	Entire length	2011	No
Mudlick Run	WVOMI-23-B-3	Fecal Coliform	Unknown	2.1	Entire length	2011	No
Coallick Run	WVOMI-23-C	Fecal Coliform	Unknown	1.3	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Willow Fork	WVOMI-23-E	Fecal Coliform	Unknown	3.7	Entire length	2011	No
		Iron	Unknown	3.7	Entire length	2011	No
Buck Run	WVOMI-23-E-1	Fecal Coliform	Unknown	2.6	Entire length	2011	No
Peach Fork	WVOMI-23-G	Fecal Coliform	Unknown	1.5	Entire length	2011	No
UNT/Peach Fork RM 0.42	WVOMI-23-G-0.5	Fecal Coliform	Unknown	0.8	Entire length	2011	No
		Iron	Unknown	0.8	Entire length	2011	No
Gorrell Run	WVOMI-24	CNA-Biological	Unknown	4.4	Entire length	2011	No
		Fecal Coliform	Unknown	4.4	Entire length	2011	No
Indian Creek	WVOMI-29	Fecal Coliform	Unknown	14.8	Entire length	2011	No
Big Run	WVOMI-29-A	Fecal Coliform	Unknown	4.9	Entire length	2011	No
Walnut Fork	WVOMI-29-E	Fecal Coliform	Unknown	3.5	Entire length	2011	No
McElroy Creek	WVOMI-30	Fecal Coliform	Unknown	22.1	Entire length	2011	No
		Iron	Unknown	22.1	Entire length	2011	No
Flint Run	WVOMI-30-H	Fecal Coliform	Unknown	7.5	Entire length	2011	No
Little Flint Run	WVOMI-30-H-1	Fecal Coliform	Unknown	4.0	Entire length	2011	No
Talkington Fork	WVOMI-30-N	Fecal Coliform	Unknown	6.7	Entire length	2011	No
Pike Fork	WVOMI-30-P	Fecal Coliform	Unknown	5.8	Entire length	2011	No
Sycamore Fork	WVOMI-30-P-1	Fecal Coliform	Unknown	4.4	Entire length	2011	No
Robinson Fork	WVOMI-30-O	Fecal Coliform	Unknown	10.0	Entire length	2011	No
Big Battle Run	WVOMI-30-O-2	CNA-Biological	Unknown	5.1	Entire length	2011	No
		Fecal Coliform	Unknown	5.1	Entire length	2011	No
Camp Mistake Run	WVOMI-39	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Arnold Creek	WVOMI-40	Fecal Coliform	Unknown	10.9	Entire length	2011	No
		Iron	Unknown	10.9	Entire length	2011	No
Long Run	WVOMI-40-B	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Wilhelm Run	WVOMI-40-E	Fecal Coliform	Unknown	3.5	Entire length	2011	No
Claylick Run	WVOMI-40-F	Fecal Coliform	Unknown	3.7	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Right Fork/Arnold Creek	WVOMI-40-I	CNA-Biological	Unknown	4.6	Entire length	2011	No
		Fecal Coliform	Unknown	4.6	Entire length	2011	No
Left Fork/Arnold Creek	WVOMI-40-J	Fecal Coliform	Unknown	4.9	Entire length	2011	No
UNT/Middle Island Creek RM 67.32	WVOMI-41.5	Fecal Coliform	Unknown	1.2	Entire length	2011	No
		Iron	Unknown	1.2	Entire length	2011	No
Bluestone Creek	WVOMI-43	Fecal Coliform	Unknown	7.6	Entire length	2011	No
Meathouse Fork	WVOMI-46	Fecal Coliform	Unknown	19.7	Entire length	2011	No
		Iron	Unknown	19.7	Entire length	2011	No
Lick Run	WVOMI-46-B	Fecal Coliform	Unknown	4.5	Entire length	2011	No
		Iron	Unknown	4.5	Entire length	2011	No
Toms Fork	WVOMI-46-E	Iron	Unknown	9.3	Entire length	2011	No
Brushy Fork	WVOMI-46-H	Fecal Coliform	Unknown	4.1	Entire length	2011	No
		Iron	Unknown	4.1	Entire length	2011	No
Snake Run	WVOMI-46-I	Fecal Coliform	Unknown	1.8	Entire length	2011	No
Indian Fork	WVOMI-46-J	Fecal Coliform	Unknown	4.7	Entire length	2011	No
Big Isaac Creek	WVOMI-46-R	Fecal Coliform	Unknown	2.0	entire length	2011	No
Buckeye Creek	WVOMI-47	Fecal Coliform	Unknown	12.7	Entire length	2011	No
Buckeye Run	WVOMI-47-C	Fecal Coliform	Unknown	5.4	Entire length	2011	No
		Iron	Unknown	5.4	Entire length	2011	No
UNT/Buckeye Run RM 3.35	WVOMI-47-C-2.6	Fecal Coliform	Unknown	0.5	Entire length	2011	No
		Iron	Unknown	0.5	Entire length	2011	No
Buffalo Calf Fork	WVOMI-47-E	Fecal Coliform	Unknown	3.4	Entire length	2011	No

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Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
MIDDLE OHIO SOUTH WATERSHED - HUC# 05030202							
Crooked Creek	WVO-20.5	Fecal Coliform	Unknown	8.6	Entire length	2011	No
		Iron	Unknown	8.6	Entire length	2011	No
Oldtown Creek	WVO-21	Fecal Coliform	Unknown	19.4	Entire length	2011	No
		Iron	Unknown	19.4	Entire length	2011	No
Turkey Run	WVO-21-0.5A	CNA-Biological	Unknown	2.9	Entire length	2011	No
		Fecal Coliform	Unknown	2.9	Entire length	2011	No
		Iron	Unknown	2.9	Entire length	2011	No
Potter Creek	WVO-21-A	CNA-Biological	Unknown	3.6	Entire length	2011	No
Robinson Run	WVO-21-B	Fecal Coliform	Unknown	5.7	Entire length	2011	No
		Iron	Unknown	5.7	Entire length	2011	No
UNT/Robinson Run RM 2.42	WVO-21-B-0.9	Fecal Coliform	Unknown	1.2	Entire length	2011	No
UNT/Robinson Run RM 3.33	WVO-21-B-2	Fecal Coliform	Unknown	1.6	Entire length	2011	No
		Iron	Unknown	1.6	Entire length	2011	No
Trace Fork	WVO-21-C	Fecal Coliform	Unknown	4.4	Entire length	2011	No
		Iron	Unknown	4.4	Entire length	2011	No
Mill Run	WVO-22	Fecal Coliform	Unknown	4.9	Entire length	2011	No
		Iron	Unknown	4.9	Entire length	2011	No
Tenmile Creek	WVO-23	Fecal Coliform	Unknown	9.6	Entire length	2011	No
		Iron	Unknown	9.6	Entire length	2011	No
UNT/Tenmile Creek RM 4.13	WVO-23-B.5	Fecal Coliform	Unknown	0.6	Entire length	2011	No
UNT/Tenmile Creek RM 5.33	WVO-23-C	CNA-Biological	Unknown	1.6	Entire length	2011	No
		Iron	Unknown	1.6	Entire length	2011	No
Sliding Hill Creek	WVO-24	Fecal Coliform	Unknown	4.8	Entire length	2011	No
		Iron	Unknown	4.8	Entire length	2011	No
UNT/Sliding Hill Creek RM 1.25	WVO-24-A	Fecal Coliform	Unknown	4.8	Entire length	2011	No
		Iron	Unknown	4.8	Entire length	2011	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Broad Run	WVO-25	Fecal Coliform	Unknown	1.6	Entire length	2011	No
		Iron	Unknown	1.6	Entire length	2011	No
Little Broad Run	WVO-26	CNA-Biological	Unknown	4.3	Entire length	2011	No
		Fecal Coliform	Unknown	4.3	Entire length	2011	No
		Iron	Unknown	4.3	Entire length	2011	No
West Creek	WVO-27	Fecal Coliform	Unknown	6.0	Entire length	2011	No
		Iron	Unknown	6.0	Entire length	2011	No
Mill Creek	WVO-32	CNA-Biological	Unknown	29.4	Entire length	2011	No
		Fecal Coliform	Unknown	29.4	Entire length	2011	No
		Iron	Unknown	29.4	Entire length	2011	No
Bar Run	WVO-32-C	CNA-Biological	Unknown	2.4	Entire length	2011	No
		Fecal Coliform	Unknown	2.4	Entire length	2011	No
		Iron	Unknown	2.4	Entire length	2011	No
Cow Run	WVO-32-D	CNA-Biological	Unknown	2.8	Entire length	2011	No
		Fecal Coliform	Unknown	2.8	Entire length	2011	No
		Iron	Unknown	2.8	Entire length	2011	No
Right Fork/Cow Run	WVO-32-D-1	Fecal Coliform	Unknown	1.5	Entire length	2011	No
		Iron	Unknown	1.5	Entire length	2011	No
Left Fork/Cow Run	WVO-32-D-2	CNA-Biological	Unknown	1.0	Entire length	2011	No
		Fecal Coliform	Unknown	1.0	Entire length	2011	No
		Iron	Unknown	1.0	Entire length	2011	No
Grass Run	WVO-32-H-4	Fecal Coliform	Unknown	3.3	Entire length	2011	No
		Iron	Unknown	3.3	Entire length	2011	No
Cox Fork	WVO-32-H-6	CNA-Biological	Unknown	4.1	Entire length	2011	No
		Fecal Coliform	Unknown	4.1	Entire length	2011	No
		Iron	Unknown	4.1	Entire length	2011	No

WEST VIRGINIA

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Wolfe Creek	WVO-32-H-8	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
		Iron	Unknown	3.6	Entire length	2011	No
Sycamore Creek	WVO-32-K	CNA-Biological	Unknown	6.1	Entire length	2011	No
		Fecal Coliform	Unknown	6.1	Entire length	2011	No
		Iron	Unknown	6.1	Entire length	2011	No
Left Fork/Sycamore Creek	WVO-32-K-1	CNA-Biological	Unknown	1.0	Entire length	2011	No
		Fecal Coliform	Unknown	1.0	Entire length	2011	No
		Iron	Unknown	1.0	Entire length	2011	No
Tug Fork	WVO-32-L	Fecal Coliform	Unknown	11.9	Entire length	2011	No
		Iron	Unknown	11.9	Entire length	2011	No
Bear Fork	WVO-32-L-4.5	Fecal Coliform	Unknown	1.0	Entire length	2011	No
Grasslick Creek	WVO-32-L-7	Fecal Coliform	Unknown	13.3	Entire length	2011	No
		Iron	Unknown	13.3	Entire length	2011	No
Stonelick Creek	WVO-32-L-7-B	Fecal Coliform	Unknown	5.1	Entire length	2011	No
		CNA-Biological	Unknown	6.7	Entire length	2011	No
		Fecal Coliform	Unknown	6.7	Entire length	2011	No
Laurel Run	WVO-32-L-8-B	Fecal Coliform	Unknown	2.7	Entire length	2011	No
Elk Fork	WVO-32-M	CNA-Biological	Unknown	15.4	Entire length	2011	No
		Fecal Coliform	Unknown	15.4	Entire length	2011	No
		Iron	Unknown	15.4	Entire length	2011	No
Little Mill Creek	WVO-32-N	CNA-Biological	Unknown	11.1	Entire length	2011	No
		Fecal Coliform	Unknown	11.1	Entire length	2011	No
		Iron	Unknown	11.1	Entire length	2011	No
Joes Run	WVO-32-N-2	Fecal Coliform	Unknown	1.0	Entire length	2011	No
		Iron	Unknown	1.0	Entire length	2011	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Frozencamp Creek	WVO-32-N-3	CNA-Biological	Unknown	3.0	Entire length	2011	No
		Fecal Coliform	Unknown	3.0	Entire length	2011	No
		Iron	Unknown	3.0	Entire length	2011	No
Big Run	WVO-32-N-4	Fecal Coliform	Unknown	1.7	Entire length	2011	No
		Iron	Unknown	1.7	Entire length	2011	No
Right Fork/Big Run	WVO-32-N-4-B	Fecal Coliform	Unknown	3.2	Entire length	2011	No
Left Fork/Big Run	WVO-32-N-4-C	Fecal Coliform	Unknown	3.2	Entire length	2011	No
Little Creek	WVO-32-N-5	CNA-Biological	Unknown	4.8	Entire length	2011	No
		Fecal Coliform	Unknown	4.8	Entire length	2011	No
Poplar Fork	WVO-32-N-5-B	Fecal Coliform	Unknown	1.3	Entire length	2011	No
Buffalo Creek	WVO-32-N-6	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
Spring Creek	WVO-33	Fecal Coliform	Unknown	2.5	Entire length	2011	No
Cedar Run	WVO-34	CNA-Biological	Unknown	3.4	Entire length	2011	No
		Fecal Coliform	Unknown	3.4	Entire length	2011	No
Straight Fork	WVO-36-C	Fecal Coliform	Unknown	4.1	Entire length	2011	No
Crooked Fork	WVO-36-D	CNA-Biological	Unknown	6.1	Entire length	2011	No
		Fecal Coliform	Unknown	6.1	Entire length	2011	No
		Iron	Unknown	6.1	Entire length	2011	No
Trace Fork	WVO-36-G	CNA-Biological	Unknown	6.4	Entire length	2011	No
		Fecal Coliform	Unknown	6.4	Entire length	2011	No
Beatty Run	WVO-36-H	CNA-Biological	Unknown	3.4	Entire length	2011	No
		Fecal Coliform	Unknown	3.4	Entire length	2011	No
		Iron	Unknown	3.4	Entire length	2011	No
Right Fork/Sandy Creek	WVO-36-I	CNA-Biological	Unknown	11.7	Entire length	2011	No
		Fecal Coliform	Unknown	11.7	Entire length	2011	No
		Iron	Unknown	11.7	Entire length	2011	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Biglick Run	WVO-36-I-4	Fecal Coliform	Unknown	2.7	Entire length	2011	No
Fallentimber Run	WVO-36-I-10	Fecal Coliform	Unknown	2.8	Entire length	2011	No
Cabin Run	WVO-36-I-12	Fecal Coliform	Unknown	1.7	Entire length	2011	No
		Iron	Unknown	1.7	Entire length	2011	No
Left Fork/Sandy Creek	WVO-36-J	Fecal Coliform	Unknown	16.3	Entire length	2011	No
		Iron	Unknown	16.3	Entire length	2011	No
Copper Fork	WVO-36-J-1	CNA-Biological	Unknown	4.8	Entire length	2011	No
		Fecal Coliform	Unknown	4.8	Entire length	2011	No
		Iron	Unknown	4.8	Entire length	2011	No
Turkey Fork	WVO-36-J-3	CNA-Biological	Unknown	5.5	Entire length	2011	No
		Fecal Coliform	Unknown	5.5	Entire length	2011	No
Nesselroad Run	WVO-36-J-5	Fecal Coliform	Unknown	7.6	Entire length	2011	No
		Iron	Unknown	7.6	Entire length	2011	No
Redbush Run	WVO-36-J-5-C	Fecal Coliform	Unknown	2.1	Entire length	2011	No
		Iron	Unknown	2.1	Entire length	2011	No
Maulecamp Run	WVO-36-J-5-E	Fecal Coliform	Unknown	3.1	Entire length	2011	No
		Iron	Unknown	3.1	Entire length	2011	No
Lockhart Fork	WVO-36-J-8	Fecal Coliform	Unknown	3.0	Entire length	2011	No
		Iron	Unknown	3.0	Entire length	2011	No
Little Sandy Creek	WVO-38	Fecal Coliform	Unknown	7.8	Entire length	2011	No
Roadfork Run	WVO-38-A	Fecal Coliform	Unknown	4.2	Entire length	2011	No
		Iron	Unknown	4.2	Entire length	2011	No
Washington Run	WVO-41	CNA-Biological	Unknown	3.6	Entire length	2011	No
		Fecal Coliform	Unknown	3.6	Entire length	2011	No
		Iron	Unknown	3.6	Entire length	2011	No
Pond Creek	WVO-43	Fecal Coliform	Unknown	16.0	Entire length	2011	No
		Iron	Unknown	16.0	Entire length	2011	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Little Pond Creek	WVO-43-D	Fecal Coliform	Unknown	7.9	Entire length	2011	No
		Iron	Unknown	7.9	Entire length	2011	No
Jesse Run	WVO-43-D-2	CNA-Biological	Unknown	0.6	Entire length	2011	No
		Iron	Unknown	0.6	Entire length	2011	No
UNT/Jesse Run RM 0.44	WVO-43-D-2-0.5A	Iron	Unknown	1.0	Entire length	2011	No
Jerrys Run	WVO-43-H	Fecal Coliform	Unknown	3.1	Entire length	2011	No
		Iron	Unknown	3.1	Entire length	2011	No
Joshus Fork	WVO-43-K	Fecal Coliform	Unknown	1.7	Entire length	2011	No
		Iron	Unknown	1.7	Entire length	2011	No
South Fork/Lee Creek	WVO-44-A	Fecal Coliform	Unknown	11.2	Entire length	2011	No
		Iron	Unknown	11.2	Entire length	2011	No
Middle Fork/South Fork/Lee	WVO-44-A-1	Fecal Coliform	Unknown	3.2	Entire length	2011	No
Willow Run	WVO-44-A-2	Fecal Coliform	Unknown	2.2	Entire length	2011	No
North Fork/Lee Creek	WVO-44-B	Fecal Coliform	Unknown	20.0	Entire length	2011	No
		Iron	Unknown	20.0	Entire length	2011	No
Woodyards Run	WVO-44-B-2	Fecal Coliform	Unknown	3.1	Entire length	2011	No
		Iron	Unknown	3.1	Entire length	2011	No
Gunners Run	WVO-44-B-4	CNA-Biological	Unknown	1.6	Entire length	2011	No
		Fecal Coliform	Unknown	1.6	Entire length	2011	No
Sandy Creek	WVO-46	CNA-Biological	Unknown	5.3	Entire length	2011	No
		Fecal Coliform	Unknown	5.3	Entire length	2011	No
		Iron	Unknown	5.3	Entire length	2011	No
Vaughts Run	WVO-46-A	CNA-Biological	Unknown	3.9	Entire length	2011	No
		Fecal Coliform	Unknown	3.9	Entire length	2011	No
		Iron	Unknown	3.9	Entire length	2011	No
UNT/Sandy Creek RM 4.97	WVO-46-J	Fecal Coliform	Unknown	1.7	Entire length	2011	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
Pond Run	WVO-48	CNA-Biological	Unknown	6.8	Entire length	2011	No
		Fecal Coliform	Unknown	6.8	Entire length	2011	No
		Iron	Unknown	6.8	Entire length	2011	No
Little Pond Run	WVO-48-A	CNA-Biological	Unknown	2.8	Entire length	2011	No
		Fecal Coliform	Unknown	2.8	Entire length	2011	No
		Iron	Unknown	2.8	Entire length	2011	No
Briscoe Run	WVO-49	Fecal Coliform	Unknown	2.8	Entire length	2011	No
		Iron	Unknown	2.8	Entire length	2011	No
Big Run	WVO-50	Fecal Coliform	Unknown	10.1	Entire length	2011	No
Williams Creek	WVO-50-A	Fecal Coliform	Unknown	3.4	Entire length	2011	No
		Iron	Unknown	3.4	Entire length	2011	No
Plum Run	WVO-50-B	CNA-Biological	Unknown	2.6	Entire length	2011	No
		Fecal Coliform	Unknown	2.6	Entire length	2011	No
Hogland Run	WVO-50-D	CNA-Biological	Unknown	2.4	Entire length	2011	No
		Fecal Coliform	Unknown	2.4	Entire length	2011	No
		Iron	Unknown	2.4	Entire length	2011	No
POTOMAC DIRECT DRAINS WATERSHED - HUC# 02070004							
Rockymarsh Run	WVP-3	Fecal Coliform	Unknown	4.7	Entire length	2021	No
UNT/Rockymarsh Run RM 3.99	WVP-3-B	Fecal Coliform	Unknown	2.9	Entire length	2021	No
TUG FORK WATERSHED - HUC# 05070201							
Spice Creek	WVBST-78	CNA-Biological	Unknown	5.7	Entire length	2021	No
Davy Branch	WVBST-85	CNA-Biological	Unknown	4.1	Entire length	2021	No
Browns Creek	WVBST-98	CNA-Biological	Unknown	5.1	Entire length	2021	No
Puncheoncamp Branch	WVBST-98-A	CNA-Biological	Unknown	3.0	Entire length	2021	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP D							
GREENBRIER WATERSHED - HUC# 05050003							
Greenbrier River	WVKNG	CNA-Algae	Unknown	102.8	Mouth to RM 102.78 (Beaver Ck)	2022	No
Howard Creek	WVKNG-25	CNA-Biological	Unknown	6.2	Mouth to RM 6.2	2022	No
LITTLE KANAWHA WATERSHED - HUC# 05030203							
Copen Run	WVLK-90	CNA-Biological	Unknown	5.2	Entire length	2022	No
WEST FORK SUBWATERSHED							
Sang Run	WVLKW-15-I-9	CNA-Biological	Unknown	1.6	Entire length	2022	No
LOWER NEW WATERSHED - HUC# 05050004							
Hamilton Branch	WVKN-22-D-1	CNA-Biological	Unknown	2.9	Entire length	2022	No
Bowyer Creek	WVKN-26-M	CNA-Biological	Unknown	4.4	Entire length	2022	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
MONONGAHELA WATERSHED - HUC# 05020003							
Dillan Creek	WVM-8-G	pH	Unknown	5.4	Entire length	2012	No
UNT/Kanes Creek RM 2.36	WVM-8-I-0.9	Aluminum (d)	Unknown	0.6	Entire length	2012	No
		pH	Unknown	0.6	Entire length	2012	No
UNT/Kanes Creek RM 2.49	WVM-8-I-1	Aluminum (d)	Unknown	0.8	Entire length	2012	No
UNT/Bethel Run RM 0.81	WVM-23-E-0.5-A	CNA-Biological	Unknown	1.7	Entire length	2012	No
UPPER NEW WATERSHED - HUC# 05050002							
BLUESTONE RIVER SUBWATERSHED							
UNT/Jumping Branch RM 2.48	WVKNB-3-C-1-E	CNA-Biological	Unknown	0.9	Entire length	2022	No
Widemouth Creek	WVKNB-28	Iron (trout) AQ	Unknown	6.6	Entire length	2022	No

Supplemental Table F - 2010 Section 303(d) - List - New Listings

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2008 list?
HYDROLOGIC GROUP E							
CACAPON WATERSHED - HUC# 02070003							
UNT/Mill Branch RM 1.99	WVPC-12-B	CNA-Biological	Unknown	2.6	Entire length	2023	No
TWELVEPOLE WATERSHED - HUC# 05090102							
Frances Creek	WVO-2-Q-18-F	CNA-Biological	Unknown	3.6	Entire length	2023	No
Jims Branch	WVO-2-Q-18-H	CNA-Biological	Unknown	0.9	Mouth to RM 0.9	2023	No
UPPER OHIO SOUTH WATERSHED - HUC# 05030106							
Fish Creek	WVO-77	CNA-Biological	Unknown	9.9	RM 16.7 to HW	2023	No
UPPER GUYANDOTTE WATERSHED - HUC# 05070101							
Dingess Run	WVOG-68	CNA-Biological	Unknown	7.4	Entire length	2023	No
WEST FORK WATERSHED - HUC# 05020002							
UNT/Shinns Run RM 4.15	WVMW-11-E	Aluminum (d)	Unknown	1.0	Entire length	2023	No
		CNA-Biological	Unknown	1.0	Entire length	2023	No
		Iron	Unknown	1.0	Entire length	2023	No
		pH	Unknown	1.0	Entire length	2023	No
Polk Creek	WVMW-39	CNA-Biological	Unknown	8.5	Entire length	2023	No
		Fecal Coliform	Unknown	8.5	Entire length	2023	No

David Rider/R3/USEPA/US
12/23/2010 11:06 AM

To Christopher Hunter
cc
bcc
Subject Fw: More selenium details in Draft EIS - Re: Fw: Spruce & selenium & your help

Chris,

I see you just updated the final EIS this morning also.

Dave

----- Forwarded by David Rider/R3/USEPA/US on 12/23/10 11:05 AM -----

More selenium details in Draft EIS - Re: Fw: Spruce & selenium & your help

David Rider to: Stefania Shamet 12/23/10 11:03 AM

Cc: John Forren

Stef,

There is more detail on selenium handling in the **Draft** EIS starting around page 2-51. I just up-loaded the Draft to the connector a few minutes ago. It is searchable so just search selenium and you will find multiple hits. Both draft and final are now in the EIS directory. I hope that helps.

Dave

ESC@EPA

12/28/2010 12:46 PM

To Gwen Arnold, Frank Borsuk, Kristopher DeNardi, Mark Douglas, Michael Dunn, John Forren, Jennifer Fulton, Gregory Gies, Joy Gillespie, Nancy Grundahl, Palmer Hough, Bill Jenkins, Jeffrey Lapp, Matthew Lee, Michael Mansolino, Christine Mazzarella, Richard Paiste, Margaret Passmore, Regina Poeske, Greg Pond, Louis Reynolds, Charles Rhodes, David Rider, Stefania Shamet, Carrie Traver

cc

bcc

Subject ESC Project Update: Spruce Mine Data and References/ New resources added by Christopher Hunter

Spruce Mine Data and References - Environmental Science Connector Update

Christopher Hunter has added the following resources to the Spruce Mine Data and References project.

- Appendix 4 Selenium 1221010

The resources were added in the Spruce Mine Data and References \ Final Determination drafts folder.

Review Spruce Mine Data and References project

The search feature can be used to quickly locate these resources by searching on title or today's date.

If you do not wish to receive email notifications for this project, please go to the ESC My Profile Page to change your notification preferences.

Matthew Klasen/DC/USEPA/US

12/28/2010 02:24 PM

To Susan Cormier

cc

bcc

Subject Re: Fw: Draft SAB Advisory Report approved for SAB Web site - Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills for the 10-04 Mountaintop Mining Valley-Fill Ecological Assessment Advisory Activity

Thanks Susan. This is just the MTM/VF report, right (not conductivity)?

Matt Klasen
U.S. Environmental Protection Agency
Office of Water (IO)
202-566-0780
cell (202) 380-7229

Susan Cormier -----Forwarded by Susan Cormier/CI/USEPA/US... 12/28/2010 02:19:05 PM

From: Susan Cormier/CI/USEPA/US
To: Glenn Suter/CI/USEPA/US@EPA, Michael Griffith/CI/USEPA/US@EPA, Michael Troyer/CI/USEPA/US@EPA, Annette Gatchett/CI/USEPA/US@EPA, Matthew Klasen/DC/USEPA/US@EPA
Date: 12/28/2010 02:19 PM
Subject: Fw: Draft SAB Advisory Report approved for SAB Web site - Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills for the 10-04 Mountaintop Mining Valley-Fill Ecological Assessment Advisory Activity

-----Forwarded by Susan Cormier/CI/USEPA/US on 12/28/2010 02:18PM -----

To: Michael Slimak/DC/USEPA/US@EPA, Susan Norton/DC/USEPA/US@EPA, Susan Cormier/CI/USEPA/US@EPA
From: Edward Hanlon/DC/USEPA/US
Date: 12/28/2010 02:08PM
Subject: Draft SAB Advisory Report approved for SAB Web site - Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills for the 10-04 Mountaintop Mining - Valley-Fill Ecological Assessment Advisory Activity

hi Mike, Sue and Susan,
FYI, the draft SAB report on the Aquatic Ecosystem Effects Report was posted today on SAB's website. The web address is attached below.....thx

----- Forwarded by Edward Hanlon/DC/USEPA/US on 12/28/2010 02:05 PM -----

From: Stephanie Sanzone/DC/USEPA/US
To: Thomas Armitage/DC/USEPA/US@EPA
Cc: Angela Nugent/DC/USEPA/US@EPA, Priscilla Tillery/DC/USEPA/US@EPA, Stephanie Sanzone/DC/USEPA/US@EPA, Wanda Bright/DC/USEPA/US@EPA, Debra Renwick/DC/USEPA/US@EPA, Aaron Yeow/DC/USEPA/US@EPA, Lisette Brooks/DC/USEPA/US@EPA, Anthony Maciorowski/DC/USEPA/US@EPA, hanlon.edward@epa.gov, armitage.thomas@epa.gov
Dat 12/28/2010 12:59 PM

e:
Subject: Draft Report Request approved for the Web site

The *Advisory on EPA's Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills* Draft Report, for the 10-04 Mountaintop Mining - Valley-Fill Ecological Assessment Advisory Activity, has been posted to the SAB Web site at this location:

http://yosemite.epa.gov/sab/sabproduct.nsf/0/ACD3A1AF5C7138E785257625006C891E?OpenDocument

The *Advisory on EPA's Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills* Draft Report, is also available in the product database:

Click here to open the Draft Report

Matthew Klasen/DC/USEPA/US	To: Gregory Peck
12/28/2010 02:25 PM	cc:
	bcc:
	Subject: Fw: Draft SAB Advisory Report approved for SAB Web site - Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills for the 10-04 Mountaintop Mining Valley-Fill Ecological Assessment Advisory Activity

FYI -- SAB's draft report on the mountaintop mining / valley fills impacts report is posted online for a January 19 teleconference with the full SAB. I'll take a look at this to see what's different.

No word yet (I don't think) on the conductivity benchmark report, but I'm checking.

mk

Matt Klasen
U.S. Environmental Protection Agency
Office of Water (IO)
202-566-0780
cell (202) 380-7229

----- Forwarded by Matthew Klasen/DC/USEPA/US on 12/28/2010 02:23 PM -----

From:	Susan Cormier/CI/USEPA/US
To:	Glenn Suter/CI/USEPA/US@EPA, Michael Griffith/CI/USEPA/US@EPA, Michael Troyer/CI/USEPA/US@EPA, Annette Gatchett/CI/USEPA/US@EPA, Matthew Klasen/DC/USEPA/US@EPA
Date:	12/28/2010 02:19 PM
Subject:	Fw: Draft SAB Advisory Report approved for SAB Web site - Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills for the 10-04 Mountaintop Mining Valley-Fill Ecological Assessment Advisory Activity

-----Forwarded by Susan Cormier/CI/USEPA/US on 12/28/2010 02:18PM -----

To: Michael Slimak/DC/USEPA/US@EPA, Susan Norton/DC/USEPA/US@EPA, Susan Cormier/CI/USEPA/US@EPA
From: Edward Hanlon/DC/USEPA/US
Date: 12/28/2010 02:08PM
Subject: Draft SAB Advisory Report approved for SAB Web site - Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills for the 10-04 Mountaintop Mining - Valley-Fill Ecological Assessment Advisory Activity

hi Mike, Sue and Susan,
FYI, the draft SAB report on the Aquatic Ecosystem Effects Report was posted today on SAB's website. The web address is attached below.....thx

----- Forwarded by Edward Hanlon/DC/USEPA/US on 12/28/2010 02:05 PM -----

From:	Stephanie Sanzone/DC/USEPA/US
To:	Thomas Armitage/DC/USEPA/US@EPA
Cc:	Angela Nugent/DC/USEPA/US@EPA, Priscilla Tillery/DC/USEPA/US@EPA, Stephanie Sanzone/DC/USEPA/US@EPA, Wanda Bright/DC/USEPA/US@EPA, Debra Renwick/DC/USEPA/US@EPA, Aaron Yeow/DC/USEPA/US@EPA, Lisette Brooks/DC/USEPA/US@EPA, Anthony

Maciorowski/DC/USEPA/US@EPA, hanlon.edward@epa.gov, armitage.thomas@epa.gov

Date: 12/28/2010 12:59 PM

Subject: Draft Report Request approved for the Web site

The ***Advisory on EPA's Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills*** Draft Report, for the 10-04 Mountaintop Mining - Valley-Fill Ecological Assessment Advisory Activity, has been posted to the SAB Web site at this location:

http://yosemite.epa.gov/sab/sabproduct.nsf/0/ACD3A1AF5C7138E785257625006C891E?OpenDocument

The ***Advisory on EPA's Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills*** Draft Report, is also available in the product database:

Click here to open the Draft Report

Matthew Klasen/DC/USEPA/US 12/28/2010 03:09 PM	To	Christopher Hunter, Brian Topping, CynthiaN Johnson
	cc	
	bcc	
	Subject	Fw: FYI -- updated draft SAB review reports on MTM available online (telecon scheduled Jan. 19)

I mentioned this to the ORD folks separately as a good topic for next week's mining call, but didn't want to put them on the hook with the big group before I hear back. Nevertheless, this is probably something good to pencil in for next Tuesday's mining call (maybe 5-10 minutes).

Thanks,
Matt

Matt Klasen
U.S. Environmental Protection Agency
Office of Water (IO)
202-566-0780
cell (202) 380-7229

----- Forwarded by Matthew Klasen/DC/USEPA/US on 12/28/2010 03:08 PM -----

From:	Matthew Klasen/DC/USEPA/US
To:	Gregory Peck/DC/USEPA/US@EPA, Brian Frazer/DC/USEPA/US@EPA, David Evans/DC/USEPA/US@EPA, Christopher Hunter/DC/USEPA/US@EPA, Jim Pendergast/DC/USEPA/US@EPA, Brian Topping/DC/USEPA/US@EPA, Ross Geredien/DC/USEPA/US@EPA, Sharmin Syed/DC/USEPA/US@EPA, Js Wilson/DC/USEPA/US@EPA, Marcus Zobrist/DC/USEPA/US@EPA, Tom Laverty/DC/USEPA/US@EPA, Joe Beaman/DC/USEPA/US@EPA, Rachael Novak/DC/USEPA/US@EPA, Lisa Huff/DC/USEPA/US@EPA, Betsy Behl/DC/USEPA/US@EPA, Karyn Wendelowski/DC/USEPA/US@EPA, Kevin Minoli/DC/USEPA/US@EPA, Margaret Passmore/R3/USEPA/US@EPA, John Forren/R3/USEPA/US@EPA, Jim Giattina/R4/USEPA/US@EPA, Colleen Forestieri/DC/USEPA/US@EPA, MichaelG Lee/DC/USEPA/US@EPA, Kevin Pierard/R5/USEPA/US@EPA
Cc:	Ephraim King/DC/USEPA/US@EPA, Denise Keehner/DC/USEPA/US@EPA, Michael Slimak/DC/USEPA/US@EPA, Susan Cormier/CI/USEPA/US@EPA, Jeff Frithsen/DC/USEPA/US@EPA, Susan Norton/DC/USEPA/US@EPA, Glenn Suter/CI/USEPA/US@EPA
Date:	12/28/2010 03:08 PM
Subject:	FYI -- updated draft SAB review reports on MTM available online (telecon scheduled Jan. 19)

Hi everyone,

ORD let us know a few minutes ago that the SAB has posted updated draft reports on both of the ORD MTM reports (the MTM/VF impacts report, and the conductivity benchmark report).

The SAB drafts are available at http://yosemite.epa.gov/sab/SABPRODUCT.NSF/MeetingCal/ED55AF1742315D34852577EC0059AADC?OpenDocument (definitely not the most straightforward URL). Reports are at the bottom of the page.

The full SAB will be holding a quality review teleconference on Wednesday, January 19 from noon to 3 pm to discuss these draft reports, in preparation for forwarding the SAB's final reports to the Administrator early next year.

Thanks,
Matt

Matt Klasen
U.S. Environmental Protection Agency
Office of Water (IO)
202-566-0780
cell (202) 380-7229

John Forren/R3/USEPA/US
12/30/2010 07:43 AM

To David Rider
cc
bcc
Subject Re: new DMRs - Spruce No. 1

Dave:

Thanks for continuing to help with Spruce on your day off. Keep track of the time.

John

John Forren
Office of Monitoring & Assessment
USEPA Philadelphia
http://epa.gov/reg3esd1/3ea50.htm

Sent from EPA's Wireless Services

David Rider

----- Original Message -----
From: David Rider
Sent: 12/30/2010 05:53 AM EST
To: Frank Borsuk; Stefania Shamet
Cc: Christopher Hunter; David Kargbo; John Forren; Margaret Passmore; Matthew Klasen
Subject: new DMRs - Spruce No. 1

All,

Additional 6 months of selenium for WV1017021.   To be inserted in Appendix 1 and elsewhere. All maximums are 5. or greater. Note: the fill color on 5/31/2010, min value (4.70) should be removed. Outlets 15 and 17 had no flow.

Dave

David E. Rider
US Environmental Protection Agency
1650 Arch Street (3EA50)
Philadelphia, PA 19103-2029
215-814-2787

[attachment "Table A2der_12-30-10.doc" deleted by John Forren/R3/USEPA/US]